Determinants and Macro-volatility Impact of International Capital Flows in Selected Sub-Saharan African Countries

William G. Brafu-Insaidoo

Thesis presented for the Degree of Doctor of Philosophy in the Graduate School of Business, Faculty of Commerce,
UNIVERSITY OF CAPE TOWN

October, 2012.

Promoter: Professor Nicholas Biekpe

DECLARATION

I, the undersigned hereby declare that the work contained in this thesis is my own original work and that I have not previously in its entirety or in part submitted it at any university for a degree.

Signature: … . Date: 17th October 2012

Signed by candidate

ABSTRACT

International capital flows have been an important subject of discussion in the finance and development literature as well as among policymakers. Discussion on international capital flows is inspired by the associated potential benefits which, in turn, have motivated a number of countries in sub-Saharan Africa and other regions to liberalise cross-border capital flows and to encourage greater inflows of foreign capital in recent times. The result of these efforts has been the recent surge in capital flows and changes in its composition towards more short-term flows. These developments, in turn, raise concerns over their causes and potential impact on the economic stability of sub-Saharan African countries. The finance and development literature suggest that financial liberalisation, changes in the quality of institutions and changes in global economic conditions are among the causes of the surge in capital flows. The finance and development literature also suggest that the impact of increased cross-border capital flows on the stability of investment, output and consumption growth are ambiguous and depends on country-specific characteristics.

In this thesis the major determinants of the volume and maturity of foreign capital flows in selected sub-Saharan African countries are investigated. The impact of the volume and type of international capital flows on the volatility of investment, output and consumption growth in the selected countries are also examined. The studies involved dynamic panel and time series regression analyses of data obtained from the World Bank and the International Monetary Fund. The results of the research work are presented as six stand-alone essays. Whilst the focus in three of the six essays was on the determinants of international capital flows, the impact of capital flows on investment, output and consumption growth volatilities in the selected countries was considered in the others. It was established in the study that financial liberalisation, regionalism and political institutions are important determinants of the volume and maturity of international capital flows in the selected countries. It was also established that increased international capital flows reduces the volatility of investment, output and consumption growth in countries that develop their domestic financial markets.

DEDICATION

This work is dedicated to my family for bearing with me for the many months that I was absent from home. More especially, I dedicate this to my father, Mr. Ebenezer Insaidoo and wife, Mrs. Madeleine Insaidoo whose untiring support has been the source of my strength throughout the study period. I ascribe all the glory to God.

ACKNOWLEDGEMENT

I extend my special thanks to my PhD supervisor and promoter, Professor Nicholas Biekpe, for his invaluable guidance and support. I also express my gratitude to African Economic Research Consortium and to Africagrowth Institute for their financial support as well as the diverse opportunities granted me to enable me to deepen my knowledge during my study period. I also express my gratitude to Matthew Ocran, Joshua Abor, Charles Adjasi, Camara Obeng and Deodat Adenutsi for their support and invaluable comments and suggestions. My profound gratitude goes to Professor Kofi N. Afful and Reverend Romeo Siaw-Mensah for their continuous encouragement and support.

TABLE OF CONTENT

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE

INTRODUCTION

1.1 Background and Problem Statement

As part of measures used to attract greater inflows of international capital, a number of countries in Sub-Saharan Africa (SSA) have reduced regulatory restrictions on cross-border capital mobility, de-regulated their domestic financial sectors and offered competitive investment environments over the past two decades. The outcome of the measures has been the experience of a rapid increase in the flows of international capital to SSA over the same period (Delechat et al., 2009). However, some studies, including a 2009 study by the International Monetary Fund, indicate that despite the surge in capital flows to the SSA, the sub region remains the least recipient of a global increase in capital flows, accounting for a merely 2 per cent in 2007. In addition, the share of short-term debt in the total flow of international capital to SSA has increased substantially over the last two decades (World Bank's World Development Indicators, 2010). The rapid rise in international capital flows, particularly private capital flows, and the change in their composition towards more short-term flows raise concerns over their potential impact on the financial and economic stability of SSA countries (Reinhart and Rogoff, 2009). The World Bank's World Development Indicators (2010) show that growth in domestic output and aggregate consumption in SSA has become more unstable in the past two decades; the period of rapid rise in international capital flows to SSA.

These concerns lead to important issues and pose challenges for policy. One of the policy challenges is how to create additional incentives for the attraction of greater international capital flows, especially foreign equity flows, to SSA. A second policy challenge is how to increase the cost of short-term capital and encourage greater flows of long-term capital in SSA. Another challenge that needs to be addressed is the possible existence of a relationship between international capital flows and economic stability in SSA countries. If a relationship between international capital flows and economic stability is established, then an additional policy challenge is how to influence the volume, type and composition of international capital flows as a means of reducing economic instability in SSA countries.

There is a large and increasing body of literature that explains factors accounting for the dynamics of international capital flows and the impact of the latter on the stability of growth in investment, output and consumption. In the finance literature, Kaminsky and Schmukler (2003), Eichengreen (2003) and Delechat et al. (2009), hypothesise that domestic and external financial liberalisation as well as quality of institutions are important pre-requisites for the successful attraction of international capital flows. Liberalisation of the domestic financial sector and the capital account transactions reduces the costs of capital flows and thus creates incentives for greater inflows of foreign capital. Lane and Milesi-Ferretti (2000), and Reinhart and Rogoff (2009), also postulate that there is a wide range of factors that explain the volume, type and maturity term-structure of international capital flows. These include risk and uncertainty factors such as market imperfections, information asymmetry, human capital development, and global conditions such as international interest rate developments and economic growth cycles in advanced countries.

Studies, including those by Delechat et al. (2009), Asiedu and Lien (2004) and the International Monetary Fund (2008), explain why countries in SSA have received a comparatively smaller share of the increased flows. However, the findings of these studies do not offer any conclusive evidence on the major determinants of international capital flows in the region. A wide range of factors have been mentioned in empirical studies as accounting for changes in the volume, type and maturity term-structure of international capital flows. These include financial liberalisation and regionalism, institutions, risks and uncertainty factors.

There is an increasing body of literature, including the works of Backus et al. (1992), Mendoza (1994) and Bekaert et al. (2006), which also postulate that the relationship between international capital flows and the volatility of growth in investment, output and consumption is ambiguous. For example, Backus et al. (1992), Razin and Rose (1994) and Hirata et al. (2004), postulate that increased cross-border capital flows enhance substitution possibilities between domestic and foreign investments, and hence, increase investment volatility. Mendoza (1994) and Baxter and King (1999), also hypothesise that the relationship between financial integration and output growth volatility is ambiguous and depends on the nature of shocks and country-specific

characteristics. However, Buch and Yener (2005), Buch et al. (2005), and Bekaert et al. (2006) predict that increased openness to international capital flows reduces consumption volatility.

Denizer et al. (2002), Prasad et al. (2005) and Ahmed and Suardi (2009), support the theoretical predictions of ambiguity in the relationship between international capital flows and macroeconomic volatility. For example, Razin and Rose (1994), Denizer et al. (2002), Grenade (2004) and Hirata et al. (2004), do not provide any clear evidence on the link between capital flows and investment volatility. Ahmed and Suardi (2009) and Easterly et al. (2001), also do not offer any clear evidence on the link between financial openness and output growth volatility. However, Ahmed and Suardi (2009), Herrera and Vincent (2008), Buch and Yener (2005), and Bekaert et al. (2006) provide evidence of the predicted negative relationship between international capital flows and consumption volatility.

However, studies that disentangle the effects of financial liberalisation on international capital flows are yet to be identified. Also, to the best of my knowledge, the impact of regionalism on foreign investment flows, as well as the role of political institutions in influencing the maturity of foreign capital, in sub-Saharan Africa remains to be explored. In addition, studies on the impact of types of international capital flows on the stability of growth in investments in SSA have not yet been documented. Lastly, studies on the impact of types of international capital flows on the dynamics of output and consumption growth instability in SSA are yet to be identified.

The research questions that emerge from the discussions above are as follows: What are the separate effects of types of domestic financial liberalisation on the volume of international capital flows in SSA countries? What are the separate effects of types of capital account liberalisation on the volume of international capital flows in SSA countries? What is the role of regionalism in the promotion of greater foreign investment flows in SSA countries? How different are the short- and long run effects of capital accounts liberalisation on international capital flows in selected SSA countries? Which factors best explain international equity flows in SSA? What influence do political institutions have on the maturity of foreign debt in SSA countries? Have the 2007-2009 global financial crises affected the dynamics of international capital flows in SSA countries? Does increased international capital mobility help SSA countries

to stabilise growth in investments, output and consumption? In addressing the above questions the study would achieve the set of research objectives presented in the next sub-section.

1.2 Research Objectives

The broad objective of this thesis is to examine the causes and macro-volatility impact of the volume, type and composition of international capital flows in selected SSA countries.[1] The specific objectives of the study are:

(a) To identify the effect of capital accounts liberalisation on the volume of international capital flows in selected SSA countries;[2]

(b) To examine the effect of domestic financial liberalisation on the volume of international capital flows in selected SSA countries;

(c) To investigate the effect of membership of active regional blocs on the volume of international capital flows in selected SSA countries;

(d) To assess the impact of political institutions and the 2007-2009 global financial crisis on the volume and maturity of external debt flows in selected SSA countries;

(e) To find out what the effects of international equity and debt inflows on investment instability are in selected SSA countries;

(f) To evaluate the effect of international equity and non-equity flows on output growth volatility; and

[1] The selected countries are made up of the 37 Sub-Saharan African countries, including 16 emerging and frontier market economies. The choice of sample countries for the study period covered is informed by data availability or limitations (see footnote 5 for list of countries studied and section 2.5 on justification for sample selection).

[2] In this thesis, external financial liberalisation and capital accounts liberalisation are used inter-changeably.

(g) To analyse the effect of external debt and non-debt capital flows on consumption growth volatility in selected SSA countries.

1.3 Relevance and Contribution of the Study to Research

The attraction and use of international capital inflows have featured prominently in the current and on-going discussions on how to attain the Millennium Development Goals (MDGs). The importance of international capital and its role in the achievement of stable and sustainable economic growth is also well-documented (United Nations Conference Trade and Development, 2000; United Nations Economic Commission on Africa, 2006). According to the 2006 study by UNECA, international capital flows play an important role by meeting the investment needs and development goals of Africa.

Also, by helping to achieve stable and sustainable economic growth, international capital flows contribute significantly to an improvement in economic development and household welfare. The welfare costs of output and consumption growth volatility in developing countries are considered to be higher than in the economically-advanced countries (Herrera and Vincent, 2008; Calderon and Schmidt-Hebbel, 2008; Pallage and Robes, 2003). The cost implications of output and consumption growth volatility include significant reductions in the growth of an economy and household consumption (Kose et al., 2006; Ramey and Ramey, 1995; Pindyck, 1991). As a result of the high costs associated with output and consumption volatilities, it becomes necessary to identify the causes of output and consumption volatilities, and to make an assessment of the impact of international capital flows on the latter. Consequently, an investigation of the causes of changes in international capital flows, and an assessment of the latter's impact on the stability of growth in investment, output and consumption in SSA has important economic policy implications. The thesis has relevance to public policy and contributes to research in various ways. One of the contributions of the thesis to policy and research is that it provides information on how different aspects of financial liberalisation, regional initiatives and reforms to political institutions affect international capital flows to selected SSA countries. Another contribution of the thesis is that it offers information on how global developments influence the type and maturity mix of international capital flows to selected SSA countries. A third contribution of the thesis is that it provides information on the

types and appropriate mix of capital flows that need to be encouraged for the achievement of economic stability in selected SSA countries. One of the value-additions to research is its focus on how types of international capital flows affect the dynamics of investment, output and consumption growth instability in selected SSA.

1.4 Organisation of the Study

The thesis is organised into eight chapters. Chapters 2 to 4 investigate the determinants of the volume, type and composition of international capital flows, while Chapters 5 to 7 examine the impact of the volume, type and composition of international capital flows on the volatility of investment, output and consumption. Figure 1.1 below provides the structure of Chapters 2 to 7. Chapters 2, 3, and 4 are covered in the first block, which investigates the determinants of international capital flows, with emphasis on the impact of financial liberalisation and political institutions. The second block, covered in chapter 5, focuses on the impact of international capital flows on investment volatility and is represented by the down left –hand-side of Figure 1.1. Chapter 6 is devoted to the third block which focuses on the impact of international capital flows on output growth volatility. Lastly, the fourth block, covered in chapter seven, examines the impact of international capital flows on consumption growth volatility and is represented on the down right-hand-side of Figure 1.1.

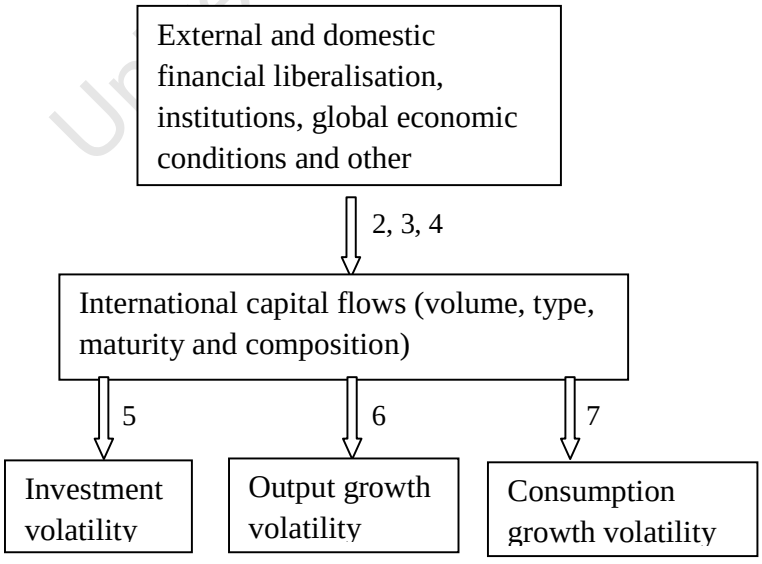


Figure 1.1: Structure of the thesis

The thesis is made up of six stand-alone essays, which are presented in individual chapters. The second Chapter of the thesis constitutes the first essay, which examines the determinants of the volume of international capital flows (aggregated and disaggregated). The essay focuses on examining the impact of financial liberalisation and regionalism on international capital flows to selected Sub-Saharan African (SSA) countries. In Chapter three, the long- and short-term impacts of financial liberalisation on foreign equity flows in selected countries are examined; South Africa and Nigeria are used as a case study. The impacts of political institutions and the 2007-2009 global economic crisis on the maturity of foreign debt inflows in the selected SSA countries are assessed in Chapter four. Chapter five comprises the fourth essay. In this essay the effect of types of international capital flows on investment volatility in selected Sub-Saharan African countries is examined. In the fifth essay (Chapter six), the influence of the structure of external finance and domestic production on the relationship between capital flows and output growth volatility in the selected countries in SSA is investigated. The last essay is presented as Chapter seven. The essay examines the impact of international capital flows on consumption growth volatility in selected SSA countries. Consequently, the central theme of the thesis is international capital flows, with emphasis on factors that explain their volume, type and maturity, and how they affect economic stability in selected countries in SSA.

Each essay is organised into five components; first there is an introduction of the theme that sets the background of the research question. In the introductory sub-section, the contribution of the study to research and knowledge is also discussed. A brief review of the related literature constitutes the second sub-section. The next sub-section presents the methodology, comprising the data collected for the study, the choice of variables and the empirical model used for the study. The results obtained from analysing the data collected for the study are presented in the fourth sub-section. In the last sub-section of each essay, the concluding remarks are presented.

1.5 References

Ahmed A. D. and Suardi, S., (2009): "Do financial and trade liberalization cause macroeconomic volatility in Sub Saharan Africa?" *Working Paper No.44,* Centre for Strategic Economic Studies: Melbourne.

Asiedu, E. and Lien, D., (2004): "Capital controls and foreign direct investment," *World Developmen*t 32 (March), 479-490.

Backus, D. K., Kehoe, P. J. and Finn E. K. (1992): "International real business cycles," *Journal of Political Economy* 100(4), 745-775.

Baxter, M. and King, R. G. (1999): "Measuring business cycles: approximate band-pass filters for economic time series," *Review of Economic and Statistics* 81(4), 575-593.

Bekaert, G., Harvey, C. and Lundbald, C. (2006): "Growth volatility and financial liberalization," *Journal of International Money and Finance* 25, 370-403. April.

Buch, C. M., Dopke, J. and Pierdzioch, C. (2005): "Financial openness and business cycle volatility", *Journal of International Money and Finance* 24(2005), 744-765.

Buch, C. M. and Yener, S. (2005): "Consumption volatility and financial openness", *Kiel Working Paper No. 1260,* Kiel Institute of World Economics: Germany.

Calderon, C. and Schmidt-Hebbel, K. (2008): "Openness and growth volatility", *Central Bank of Chile Working Paper No. 483,* Central Bank of Chile: Chile.

Delechat, C., Ramirez, G., Wagh, S., and Wakeman-Linn, J. (2009): "Sub-Saharan Africa's integration in the global financial markets", *IMF Working paper* 09/114, International Monetary Fund: Washignton D.C.

Denizer, C. A., Iyigun, M. F. and Owen, A. (2002): "Finance and macroeconomic volatility", *The B.E. Journal of Macroeconomics* 2(1), 7.

Easterly, W., Islam, R. and Stiglitz, J. E. (2001): "Shaken and stirred: explaining growth

volatility", in B. Pleskovic and N. Stern (eds), *Annual World Bank Conference on Development Economics*, Washington: the World Bank.

Eichengreen, B. (2003): *Capital flows and crisis.* Cambridge: the MIT Press.

Grenade, K (2004): Financial integration and macroeconomic volatility in the ECCU. 36th Annual Monetary Studies Conference, Trinidad and Tobago November 1-4, 2004.

Herrera, S. and Vincent, B. (2008): "Public expenditure and consumption volatility," *Policy Research Working Paper* 4633, the World Bank: Washington D.C.

Hirata, H., Kim, S. H. and Kose, M. A. (2004): "Integration and fluctuations: The case of MENA", *Emerging Markets Finance and Trade* 40 (6), 48-67.

International Monetary Fund, Regional Economic Outlook: Sub-Saharan Africa in *World Economic and Financial Surveys*, April 2008.

International Monetary Fund, Regional Economic Outlook: Sub-Saharan Africa *in World Economic and Financial Surveys*, April 2009.

Kaminsky, G. and Sergio, L. S. (2003): "Short-run pain, long-run gain: the effects of financial liberalisation", *IMF Working Paper* No. 03/34, International Monetary Fund: Washington, D. C.

Kose, A. M., Prasad, E., Rogoff, K. and Shang-Jim, W. (2006): "Financial globalization: a reappraisal," *IMF Working paper 06/189*, International Monetary Fund: Washington, .D. C.

Lane, P. and Milesi-Ferretti G. M. (2000): "External capital structure: theory and evidence", IMF Working Paper 00/152, International Monetary Fund: Washington, D. C.

Mendoza, E. (1994): "The terms of trade, the real exchange rate and economic fluctuations", *International Economic Review* 36(1994), 101-137.

Pallage, S. and Robes, M. (2003): "On the welfare cost of economic fluctuations in developing countries", *International Economic Review* 44(2), 677-698.

Prasad, E., Kose, A. M., Rogoff, K. and Shang-Jin, W. (2005): "Financial Globalization beyond the Blame Game", *Finance and Development* Volume 44(1), 9-13.

Pyndick, R. S. (1991): "Irreversibility, uncertainty and investment", *Journal of Economic Literature* 29(3), 1110-48.

Ramey, G. and Ramey, V. A. (1995): 'Cross-country evidence on the link between volatility and growth", *American Economic Review* 85(5), 1138-1151.

Razin, A. and Rose, A. K. (1994): "Business-cycle volatility and openness: an exploratory cross-sectional analysis", in L. Leiderman and A. Razin (eds), *Capital mobility: the impact on consumption, investment, and growth*, 48-76. (Cambridge: University Press).

Reinhart, C. and Rogoff, K. (2009): "This time it's different: eight centuries of financial folly", MPRA Paper No. 17452, September 2009, Munich Personal RePEc Archive: Munich. http://mpra.ub.uni-muenchen.de/17452/

United Nations Economic Commission for Africa (2006): "Capital flows and development financing in Africa", *in Economic Report on Africa 2006*: Addis Ababa.

United Nations Conference on Trade and Development (2000): "Capital flows and economic growth in Africa", UNCTAD/GDS/MDPB/7: United Nations, Geneva 2000.

World Bank: World Development Indicators, 2010

CHAPTER TWO

DETERMINANTS OF FOREIGN CAPITAL FLOWS IN SELECTED SUB-SAHARAN AFRICAN COUNTRIES

2.1 Introduction

Among the many arguments put forward in support of international capital mobility is that the process leads to more efficient allocation of global resources and improved risk sharing opportunities (Prasad et al., 2005). As a result of the benefits of international capital movements, most countries have taken steps to encourage cross-border investment flows. This has led to a surge in international investment flows over the past two decades (Agenor, 2003; Lane and Milesi-Ferretti, 2003; Morrison and White, 2004; and Vo, 2005). However, Sub-Saharan Africa has received a comparatively smaller share of the increased global flows.[3] This raises an important issue and policy challenge for the region, namely, how to increase incentives as part of efforts to attract a greater share of the increased global flows.

It is hypothesized by Kaminsky and Schmukler (2003) that domestic and external financial liberalisation reduces the costs of international capital flows, encouraging greater flows of international finance. It is also hypothesized by Baldwin (1997) and Wakeman-Linn and Wagh (2008) that the achievement of regional integration serves to attract greater foreign investments. Additionally, it is postulated by Lucas (1990), Eichengreen (2003), Alfaro et al. (2008) and Delechat et al. (2009) that 'country-specific fundamentals' account for the volume of international capital flows. The 'country-specific fundamentals' refer to technology, human capital, institutional quality and government policy on domestic and external finance. Other factors mentioned in theoretical literature (see, for example, Rogoff and Reinhart, 2003) as important in explaining capital flows include uncertainty factors, such as market imperfections, and global conditions, such as international interest rate developments.

[3]Total foreign private capital inflow and official aid inflow to Sub-Saharan Africa amounted to 126 billion United States Dollars, accounting for merely 2 percent of total global capital inflows in 2007 (International Monetary Fund, 2008).

Studies, including those by Delechat et al. (2009), Asiedu and Lien (2004) and the International Monetary Fund (2008), explain why Sub-Saharan African countries have received comparatively smaller shares of the increased flows. However, these studies do not offer any conclusive evidence on the major determinants of international capital flows in the region.

The impact of external financial liberalisation and regionalism on capital flows has been explained in finance literature. However, empirical studies that disentangle the effects of financial sector liberalisation are yet to be identified. Also, to the best of our knowledge, the impact of regionalism on foreign investment flows in Sub-Saharan Africa remains to be explored.

This essay seeks to examine the impacts of domestic and external financial liberalisation, as well as the impact of regionalism on foreign capital flows to a sample of selected Sub-Saharan African countries.[4] It also seeks to investigate the role played by emerging and frontier market economies in attracting foreign capital to Sub-Saharan Africa. The contribution of this paper to research is to disentangle the effects of financial liberalisation on international capital flows in Sub-Saharan African countries. Another contribution to research is to analyse the impact of regionalism on international capital flows in sub-Saharan Africa. Unlike Delechat et al. (2009), this study attempts to explain the time dynamics of international capital flows, using the dynamic panel regression analysis strategy.

The rest of the essay is organised as follows. The next section reviews the basic theories on international capital flows, namely the neoclassical theory and the works of Lucas (1990). Section three of reviews literature on the potential determinants of international capital flows. The hypothesis and estimated empirical model are discussed in section four. Section five gives the sources and description of data used for the study, as well as a brief discussion of the variables used for the study. The estimation results for aggregated and disaggregated foreign capital flows are presented and discussed in section six. Finally, section seven summarises the

[4]Thirty-seven (37) Sub-Saharan African countries were selected for the study. These include 16 emerging and frontier market economies. The choice of sample countries for the study period covered is informed by data availability or limitations (see footnote 6 for list of countries studied and section 2.5 on justification for sample selection).

findings of the research and concludes the discussion by indicating the basic limitation of the study and offering some directions for future extensions.

2.2 Literature Review

Much of the recent literature on the determinants of international capital flows has centred on offering explanations for the works of Lucas (1990) referred to as the 'Lucas Paradox' and the conventional neoclassical theory. The two basic theories that explain international capital movements, namely the neoclassical theory and the 'Lucas Paradox' are discussed in turn.

According to the traditional neoclassical theory, capital must move from the capital-surplus advanced economies to the capital-deficient poor countries because of the higher expected rate of return on investment in the poor countries. Returns are higher in the capital-scarce poor countries for the reason that the capital-labour ratio is comparatively low in those countries. This hypothesis works under conditions of free capital mobility and is also based on the fact that investment opportunities are already exploited in advanced countries with a comparatively high capital-labour ratio. The theory posited here is that this direction of movement of capital should continue until investment returns are equalised in all the countries. However, empirical evidence largely points to a greater flow of capital among developed economies to the extent that developing countries have been relatively marginalised (Obstfeld and Taylor, 2004).

The work of Lucas (1990), referred to as the 'Lucas Paradox', explains why capital does not move from rich to poor countries. By comparing the United States with India, Lucas shows that the validity of the neoclassical model would imply that the marginal product of capital in India should be 58 times that of the United States. Under such circumstance, all capital should flow from the United States to India. In reality, however, such flows are not observed. Lucas questions the legitimacy of the neoclassical assumptions that account for these differences in the marginal product of capital.

An extensive body of theoretical literature has emerged following the works of Lucas. These include the works of Rogoff and Reinhart (2003), Alfaro et al. (2008) and Delechat et al. (2009). These works, including that of Lucas himself, indicate that with the inclusion of a few

explanations, the 'Paradox' fades away. Differences in government policies, including differences in the extent of regulatory restrictions on cross-border capital movement and on activities in the domestic financial market are mentioned in literature as some of the factors that explain the failure of the neoclassical theory (Lucas, 1990; Eichengreen 2003; Alfaro et al., 2008; Delechat et al., 2009).

Theories that explain the impact of joint liberalisation of capital flows and of activities in the domestic financial system can be found in the works of Bacchetta (1992), Bacchetta and van Wincoop (`1998). For instance, Bacchetta (1992) used an overlapping generation model and explained that the joint liberalisation leads to a large net inflow of international capital in the initial period. After a while, the net capital inflows reduce and may eventually be substituted by net outflows. The basic limitation of the Bacchetta (1992) framework is that it focuses only on a small open economy and examines the impact of the once-and-for-all liberalisation. It ignores the role of uncertainty and fails to analyse the impact of gradual liberalisation. The impact of both instant and gradual liberalisation on the dynamics of capital flows is analysed in the work of Bacchetta and van Wincoop (1998), which is an improvement on the work of Bacchetta (1992). By assuming the presence of market uncertainty and a costless movement of capital across national boundaries, Bacchetta and van Wincoop (1998) suggest that an irreversible, once-and-for-all liberalisation leads to an immediate increase in capital inflows at initial stages, accompanied later by a gradual decline to a higher steady-state level. Higher adjustment costs however reduce the margin of capital flows above the previous steady-state level. The steady-state level of capital flows is the level of flows achieved by a national economy when it is perfectly or highly integrated into international capital markets. Bacchetta and van Wincoop (1998) argue that a once-for-all liberalisation is not a realistic option, and that investment can be made attractive through a gradual implementation of a number of liberalisation and reform measures and at different times. Ishii and Habermeier (2002) also contend that gradual liberalisation, appropriately sequenced and supported by a sound and sustainable macroeconomic environment, allows for the attraction of international capital into investments with the highest rates of return. The gradual liberalisation also leads to the attraction of greater inflows of long-term capital, especially foreign direct investment (FDI), which entails the transfer of superior

technology to developing and emerging economies (Bacchetta and van Wincoop, 1998; Ishii and Habermeier, 2002).

In sum, theory suggests that the liberalisation of domestic financial market activities and the reduction of regulatory restrictions on cross-border capital movements lead to the attraction of greater inflows of international capital.

2.3 Determinants of capital flows

A number of factors that influence international capital flows have been identified in previous empirical studies analysing international financial integration in Sub-Saharan Africa and other developing countries. These include; financial liberalisation, regional institutional arrangement, political risk, level of domestic financial development, openness to external commodities trade and international interest rate movements. These are discussed in turn.

2.3.1 Financial liberalisation

In literature, the relaxation of government policy restrictions on cross-border capital movements and the deregulation of domestic financial markets are considered as essential pre-conditions for the achievement of international financial integration (Prasad et al., 2003). The liberalisation policies have an influence on foreign and domestic investors' decisions on the allocation of their funds locally or abroad as a result of their influence on prices, transaction costs, returns on assets and quantitative limits of ownerships and investments. Consequently, they affect both the volume and composition of international capital flows (Lane and Miles-Ferretti, 2003).

A number of identified studies on international capital flows in Sub-Saharan Africa, including Delechat et al. (2009), Asiedu and Lien (2004) and the International Monetary Fund's 2008 study examined the relationship between external financial liberalisation and international capital flows. Most of these studies used aggregated indices or binary dummy as proxy measures for financial liberalisation and failed to establish any significant or clearer relationship between financial liberalisation and international capital flows. The use of an aggregated index for liberalisation does not capture the impact of a specific type of regulatory restriction directly targeted at a type of foreign capital inflows. In addition, the use of binary indicators does not

capture the impact of the intensity of liberalisation on capital flows. Other related studies focusing on other developing countries, including Forbes (2007), Edison and Reinhart (2001), Edwards (1999) and Ostry et al. (2010), also point to a disagreement over the effectiveness of capital account restrictions.

The lack of a consensus, in the empirical literature, on the impact of financial liberalisation on international capital flows could be attributed to the failure to isolate the impacts of the liberalisation. Our contribution to research is to disentangle the impact of financial liberalisation on overall foreign investment inflows.

By our definition, financial liberalisation refers to liberalisation of the domestic financial sector and capital accounts transactions. Domestic financial sector liberalisation refers to the reduction of regulatory restrictions on the domestic financial system which consists of the deregulation of deposit interest rates and lending interest rates, credit decontrols, and the relaxation of restrictions on foreign currency deposits. Capital accounts liberalisation refers to the reduction of regulatory restrictions on cross-border capital movements which covers direct regulations on foreign direct investment inflows, regulations on banks' overseas borrowing and regulations on foreigners' purchase of shares in domestic equity markets as well as the elimination of the indirect control measure of multiple exchange rate practices. In this study, the chronology used by Kaminsky and Schmukler (2003) was adopted for the construction of the liberalisation index. The criteria for determining the extent of liberalisation of the domestic financial system and of the external capital accounts transaction are presented in Tables 2.1 and 2.2 under sub section 2.5.

2.3.2 Regional institutional arrangements

The important role of regional institutional arrangements and co-operations is also highlighted in the works of Wakeman-Linn and Wagh (2008) and Garcia-Herrero and Wooldridge (2007). In particular, Wakeman-Linn and Wagh (2008) specify that the prime objective of the formation of regional blocs is the achievement of regional economic and financial integration. According to Garcia-Herrero and Wooldridge (2007), member countries of a regional bloc can benefit from regional integration in terms of exploiting wide-ranging scale-economies and expanded trade

links. Other related benefits come in the form of enhanced financial development within the respective region, serving to attract greater foreign investments to the region. However, to the best of our knowledge, the impact of regional institutional arrangements on international investment flow in Sub-Saharan Africa is yet to be explored. Consequently, our second contribution to research is that regionalism helps to stimulate greater foreign investment inflows. The regionalism index value for each country is the number of active regional blocs each respective country belongs to. Higher values reflect the number of regional blocs each country belongs.

2.3.3 Institutions and political risk

Alfaro et al. (2003) and Delechat et al. (2009) point to the importance of strong or good quality institutions in the attraction of international investment. According to Alfaro et al. (2003) and Delechat et al. (2009), strong or good quality institutions offer property rights' protection, reduce uncertainty in returns and create an incentive structure for the attraction of investments. Delechat et al. (2009) rely on proxies for the rule of law and development of financial market institutions as measures of institutional quality. A 2008 study by the International Monetary Fund (IMF) also relied on a financial market development index and a business environment index as measures of institutions. Both Delechat et al. (2009) and the 2008 study by the IMF identified institutional development as important for the attraction of international capital flows.

Political institutions refer to a set of constraints or a system that governs and influences the way governments operate or function and interact with the rest of society (Rodrik, 2000; Lin and Nugent, 1995; North, 1990). They are composed of formal and informal constraints, and their enforcement characteristics. Examples of formal constraints are rules, laws and constitutions. Examples of informal constraints are norms of behaviour and codes of conduct. North (1990) and Acemoglu et al. (2004) hypothesise that political institutions influence economic performance with democratic institutions being better for the attraction of higher rates of investments and the promotion of higher economic growth rates than non-democratic institutions. The key features of a democratic institution such as the intermittent changes of policy-makers by elections, political pluralism and institutional checks and balances often protect the economic system against the abuse characteristic of most autocratic regimes. In addition,

institutionalised democracy is capable of nurturing civil liberties and securing property and contract rights, which in turn provides incentives for investment to take place. By means of defined and protected property rights, institutionalised democracy enables individuals to explore opportunity costs without restraint and to engage in entrepreneurship. Consequently, the hypothesised relationship between type of political institutions and investment is that institutionalized democracy promotes higher rates of investments. To the best of our knowledge, the role of political institutions in influencing foreign capital flows has been almost virtually ignored in the literature. The exception is Ndulu and O'Connell (1999) who contend that political institutions, in the form of democratic institutions tend to generate incentives for the attraction of investments. This study adds value to research by examining the impact of political institutions, in the form of institutionalised democracy, on international capital flows in Sub-Saharan Africa.

Political institution is measured by the index for institutionalised democracy. Data on institutionalised democracy are obtained from the World Bank's World Development Indicators database for 2010. The value of the index score is an additive 11-point scale (0-10). The value '0' indicates no democracy. Any value that is greater than '0' indicates some form of democracy. Higher values indicate higher levels of democracy (see also Appendix A2.1). We also use the weighted conflict index as proxy for political environment. The index is an aggregation of sub-indices for various features of domestic political conflict. The features of domestic political conflict include assassinations, general strikes, government strikes, riots, revolutions and anti-government demonstrations. Each of the features is assigned a specific weight. The weighted conflict index is obtained from the Data-Banks International. The values of the index are re-scaled to the nearest 1000 unit. The outcome from this approach is a range of values for the index that begins with '0' and ends at 10.437. The value '0' indicates no conflict (a highly stable political climate) and values greater than '0' indicate the existence of some form of political instability or conflict. Higher values indicate higher levels of conflict or political instability (see Appendix A2.1). Alfaro et al. (2003) suggest a high correlation between political institution and a stable or favourable political climate.

2.3.4 Domestic financial development

The level of development of the domestic financial sector is regarded as a determinant of international capital flows. According to Furstenberg (1998), a well-developed domestic financial sector makes credit available to foreign direct investors and offers increased domestic opportunities for foreign investors to diversify their portfolio investment inflows. On the asset side, large and well-developed domestic financial intermediaries tend to offer local channels through which investors can gain foreign exposure, which could possibly increase the desire for international diversification (Lane and Milesi-Ferretti, 2003). However, domestic agents could, out of necessity, decide to invest in international markets if the domestic financial sector is underdeveloped. Also, foreign investors could decide to stay away from financial markets that do not protect their interests. As such, the ability to attract foreign investment also depends on the quality of regulations governing activities in the domestic financial sector.

Empirical studies by Ahmed et al. (2005), Vo (2005) and Delechat et al. (2009) confirm the hypothesis that higher levels of domestic financial development attract greater foreign investment inflows. Ahmed et al. (2005) and Vo (2005) used the share of domestic credit to the private sector in total GDP as a measure of domestic financial sector development and identified a positive relationship between domestic financial development and international capital flows. Delechat et al. (2009) also used an index for the development of financial institutions as a measure of domestic financial development and identified a positive correlation between private capital flows and domestic financial development.

The proxy for domestic financial development used in our study is the share of domestic credit to the private sector in GDP. The choice of the proxy is informed by the availability of data for a long time series study of this nature. In sum, the hypothesis drawn from the reviewed literature, including Lane and Milessi-Ferretti (2003), is that higher levels of domestic financial development create incentives for the attraction of greater foreign investments.

2.3.5 Openness to international trade in commodities

There have been numerous empirical studies in which the relationship between external commodities' trade openness and international capital flows was explored. In most of such studies the focus is on the relationship between foreign direct investment and external trade, and

a positive relationship between foreign capital flows and external trade openness is indicated. Examples of such studies are those by Asiedu (2002) and Morisset (2000). According to Ahmed et al. (2005) and Asiedu (2002) investors who focus on direct production, do not only target the local market, but are also often interested in the international market and hence engage in export-oriented activities. Consequently, there is a tendency for them to favour countries with a large traded goods sector. In addition to market expansion for goods and services, increased international commodities trade tends to be accompanied by financial transactions such as trade credit, transportation costs and export insurance (Lane and Milesi-Ferretti, 2003). In the case of portfolio investments, the contribution of external commodities trade to foreign portfolio inflows is ambiguous, and the degree of external trade openness may be expected to be marginal.

The proxy for international trade in commodities used in our study is the ratio of imports and exports to total GDP, which is the commonly used measurable indicator for external trade openness found in the literature. It measures the extent of openness of an economy to international trade in commodities and is a reflection of the de facto trade integration. In sum, the hypothesis drawn from the reviewed literature, including Ahmed et al. (2005), is that increased openness to external commodities trade attracts greater foreign investments.

2.3.6 Developments in global economy

The impact of global developments on international capital flows is also well-documented in empirical literature. Studies in which the importance of global conditions in influencing international capital flows is highlighted include Calvo et al. (1993), Fernandez-Arias (1996) and Ahmed et al. (2005). The main global factors mentioned in the literature, as influencing capital inflows, are international interest rates movements in advanced countries and world output growth. According to Calvo et al. (1993) and Ahmed et al. (2005), international interest rate movements reflect the international returns on investments, and consequently, the opportunity cost of foreign investments. Thus, higher international interest rates and economic growth rates in advanced countries imply higher international returns on investments, and consequently the reduced attractiveness of foreign investment flows (Fernandez-Arias, 1996).

In empirical studies, including Ahmed et al. (2005) and Fernandez-Arias (1996), it is confirmed that global conditions play a dominant role in determining international capital flows. For instance, Fernandez-Arias (1996) used quarterly data for a panel of 13 middle income countries and identified that growth in capital inflows is influenced by low returns in advanced countries. Chuhan et al. (1998) also used monthly data for nine Latin American and nine Asian countries and identified global factors, namely the U.S interest rates and industrial production as important drivers of international capital flows.

In our study, the United States' long-term interest rate (which is the 10-year Treasury bond yield at constant maturity) and short-term interest rate (3-months Treasury bill rate) were used as proxies for world interest rate. They form part of the commonly used indicators for global conditions and for movements in the rate of returns on international capital (Calvo et al., 1993; Fernandez-Arias, 1996; Dasgupta and Ratha, 2000; Ahmed et al., 2005). In sum, the hypothesis drawn from the reviewed literature is that higher levels of interest rates in advanced countries relative to developing economies increase returns on investments in the capital-rich countries and reduce the flow of capital from the advanced to the developing economies.

2.3.7 Other determinants of international capital flows

Other factors identified in literature as determinants of international capital flows include the quality of human capital, availability of natural resources, macroeconomic performance and previous experience with attracting foreign investments. These are discussed in turn.

The quality of human capital and the availability of natural resources are considered in empirical literature as important factors that determine the attractiveness of a location to investors. According to Vo (2005) and Lane and Milessi-Ferretti (2003), an increase in the supply of trained and trainable labour enhances the ability of the host country to capture the positive spillover effects of foreign investment easily and to absorb superior technology. A 1997 study by the Commonwealth Secretariat also indicates that an increase in the supply of human capital often attracts higher quality investments. Studies by Edison and Reinhart (2001), Prasad et al. (2003), and Vo 2005 confirm the hypothesis that countries with well-educated citizens and natural resource-rich countries attract a greater inflow of foreign investments. Asiedu (2002),

Ahmed et al. (2005) and Hernandez et al. (2001) also indicate that the availability of natural resources tends to have a positive impact on foreign capital flows by attracting resource-based foreign direct investment inflow. As a result of data limitations, the ratios of fuel exports and mineral exports, to total merchandise exports were used in this study as indicators for natural resource availability. The finance literature, including Hernandez et al. (2001), posits that improved macroeconomic performance increases capital flows. One of the commonly used indicators for macroeconomic performance is economic growth rate. A rapidly growing economy tends to offer higher future earnings and reduced risks. It indicates expansion in domestic markets which influences both private portfolio and FDI flows positively (see Dasgupta and Ratha, 2000). Economic growth is measured by a one-period lagged value for growth in GDP per capita.

Theoretical and empirical studies, including studies by Kamaly (2002), indicate that capital flows also tend to crowd together in particular locations referred to as the 'agglomeration' effect because of the benefits associated with the concentration of investments in a given locality. Thus current levels of capital inflows depend on the host country's past success in attracting flows. In this study, a one-period lagged value for the share of capital flows in GDP is used as a proxy to capture the 'agglomeration' effect.

In the next section, we state the main working hypotheses drawn from the reviewed literature and present the estimation model with a brief discussion of the estimation strategy used for the study. The discussion includes justification for the empirical model and chosen estimation strategy.

2.4 Methodology

2.4.1 Hypotheses

From a survey of existing theoretical and empirical literature, the following are our broad working hypotheses: (a) Increased domestic financial liberalisation creates incentives for greater inflow of international capital; (b) Increased external capital accounts liberalisation serves to attract greater international capital inflows; and (c) Regionalism contributes positively to the achievement of international financial integration by emerging and developing economies.

2.4.2 Estimation model

Following from the above discussion, a dynamic panel model was estimated for identification and analysis of the main determinants of international capital flows in emerging and frontier market economies in Sub-Saharan Africa (SSA). The panel data regression analysis allows data to be pooled. It also increases degrees of freedom and allows for the analysis of both time and cross-sectional effects and heterogeneous sample units. The use of a dynamic panel model is based on the hypothesis that international capital flows to locations where investments are already concentrated. Hence, a dynamic panel model makes it possible for us to capture foreign investment agglomeration effects and to correct for the presence of residual autocorrelation, which is common in static panel specifications (Anderson and Hsiao, 1982).

The estimation equation used for the analysis of the dynamics of international capital flows is based on the work of Lane and Milesi-Ferretti (2003), Prasad et al. (2003), Delechat et al. (2009) and Garcia-Herrera and Wooldridge (2007) and is presented as follows:

$$fkiq_{i,t} = \alpha_i + \beta_{i,t} fkiq_{i,t-1} + c_{i,t}\ dfl_{i,t-1} + d_{i,t} cap_{i,t-1} + \delta_{i,t} reg_{i,t-1} + \theta X_{i,t} + u_{i,t} \qquad (2.1)$$

The dependent variable $fkiq$ is the ratio of international capital inflows to total GDP. The notation dfl is domestic financial liberalization. The notation eq_i denotes equity market liberalisation. The notation cap is the aggregated index for external capital accounts liberalisation. The symbol reg denotes active membership of regional blocs. The notation $X_{i,t}$ symbolizes a set of control variables, and u_i is an independent error term. The set of control variables used in the study are indicators for political institution, domestic financial depth, external trade openness, international interest rate, natural resource endowment and economic growth rate.

Equation 2.1 is further modified to capture the impact of the different aspects of capital accounts liberalisation and is represented as equation 2.2.

$$fkiq_{i,t} = \alpha_i + \beta_{i,t} fkiq_{i,t-1} + c_{i,t}\ dfl_{i,t-1} + d_{1i,t} fdil_{i,t-1} + d_{2i,t} fbl_{i,t-1} + d_{3i,t} eq_{i,t-1} + d_{4i,t} mxr_{i,t} + \delta_{i,t} reg_{i,t-1} + \theta X_{i,t} + v_{i,t} \qquad (2.2)$$

The notations $fdil, fbl, eq, mxr$ respectively represent indices for the liberalisation of inward FDI, overseas borrowing and the domestic equity market and the elimination of multiple exchange rate practices.

The subscripts i, t and t-1 respectively denote an individual country 'i', year or time 't' and a one year lag term of the variables of interest. Hence i = 1, 2,…….N cross sections, and periods t = 1,2,…..T, with 'N' number of countries and 'T' number of years. The study covered 37 selected SSA countries for a sample period of 30 years, from 1980 to 2009 as well as 16 SSA emerging and frontier market economies for a sample period of 35 years, from 1975 to 2009. The study also disentangles the resource rich countries by type of natural resource and investigates the impact of oil and non-oil (mineral) resource availability by including crude oil and mineral exports as proxies for oil and mineral resource availability.

The notations β, c, and d are coefficients that respectively capture the impact of the previous period's level of capital flows and components of financial liberalization on capital flows in the current period. The notations δ, θ and α respectively capture the impact of regionalism and other control variables on capital flows and a country fixed effect that controls for country specific factors that do not vary overtime. A dummy variable for emerging and frontier market economies, with the notation emf, is introduced in the specification for the total sample of countries to capture the importance of the emerging and frontier market economies in attracting international capital inflows to the region. The coefficient, represented by the notation $\emptyset$, captures the contribution of the group of emerging and frontier market economies to international capital inflows in Sub-Saharan Africa.

Estimation of the dynamic panel model involved use of the system-generalised method of moments (GMM) estimator.[5] This corrects for potential endogeneity biases that may arise from the inclusion of the lagged dependent variable in the equation and produces consistent and efficient estimates. Estimating a panel model with a lagged dependent variable by ordinary least

[5] The weakness with the application of this kind of estimation approach to a dynamic panel data model with a large time series and a comparatively small cross-section of countries is the possible existence of a high time series bias in the data construct. Data constraints did not permit a wider coverage, in terms of the cross-section of countries covered for the sample period chosen in the first estimation.

squares (OLS) estimator often leads to endogeneity biases and inconsistent estimates because by construction, the unobserved panel-level effects are correlated with the lagged dependent variables.

The assumption that foreign capital flows to locations where there is concentration of investments implies that capital flows can have the following data-generating process:

$$y_{i,t} = \beta y_{i,t-1} + \lambda X_{i,t} + V_{i,t} \quad (2.3)$$

where: y is foreign capital flows (% of GDP), X is the vector of explanatory variables and $V_{i,t}$ is structural disturbance that is decomposed into time-invariant part $\mu_{i,t}$ (individual country fixed effect) and a time varying part $\varepsilon_{i,t}$ (time specific effect).

Arellano and Bond (1991) normally recommend that the equation should be first-differenced and the lagged levels of the dependent variable must be used as instruments for the lagged differenced dependent variable. In addition, they recommend that the lag of some explanatory variables can be used as instruments for those variables, to account for the potential endogeneity of such variables.

First differencing equation 2.3 gives us the following equation.

$$y_{i,t} - y_{i,t-1} = \beta(y_{i,t-1} - y_{i,t-2}) + \lambda(X_{i,t} - X_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad (2.4)$$

Arellano and Bond (1991) confirm that using the lagged difference results in a greatly superior estimator. By first-differencing the equation, the Arellano-Bond estimator removes the panel level effects and uses instruments to form moment conditions. This estimation procedure is referred to as the first difference Generalized Method of Moments (GMM) estimator or the Generalized Method of Moments-Instrumental Variables (GMM-IV) estimator. It has the advantage of producing unbiased and consistent estimates. The number of potential instruments is huge. There is a wide range of possible instrumental variables for endogenous, predetermined and strictly exogenous explanatory variables. These can be used for single instrumental variable estimations.

A major setback of the Arellano and Bond estimator, however, is its failure to take advantage of all available moment conditions under standard assumptions (see Arellano and Bover, 1995 for details and explanation). As a result of that, the first-difference GMMM estimator produces consistent but inefficient estimates. To correct for this inherent weakness associated with the first-difference GMM estimator, Arellano and Bover (1995) and Blundell and Bond (1998) suggest a concurrent estimation of the model in both levels and first-differencing as a way of improving on the first-differenced GMM estimator. In this procedure, the first differenced variables are used as instruments in the level regression and the lagged values of the variables in levels are used as instruments in the first-differenced regression. The Arellano and Bover (1995) and Blundell and Bond (1998) estimator is known as the system-GMM estimator and is more accurate and efficient than the first-differenced GMM estimator. As a result, we employ the system-GMM estimator in our estimation of the dynamic panel data model. Lastly, an attempt is made to evaluate the soundness of the model specification by using the test for over-identifying constraints and the test of second order autocorrelation of the new residuals. The one-step system robust (sandwich) variance estimator was used to correct for biases associated with some types of misspecifications.

2.5 Data and variable definitions

Annual data for thirty-seven (37) selected countries in Sub-Saharan Africa were collected for the study. Out of the sampled countries, sixteen (16) are referred to as emerging and frontier market economies, seven (7) are known as oil-rich countries and six (6) are referred to as non-oil resource-rich countries. The study was in three stages. The first stage involved an econometric analysis of the entire sample of 37 selected countries covering a period of 30 years (from 1980 to 2009). The second stage involved an econometric analysis of the 16 emerging and frontier market economies in Sub-Saharan Africa covering a period of 35 years (from 1975 to 2009).[6]

[6] These are Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Republic of Congo, Cote d'Ivoire, Equatorial Guinea, Gabon, The Gambia, Guinea, Lesotho, Madagascar, Malawi, Mali, Mauritania, Niger, Sierra Leone, Swaziland and Togo, and the group of emerging and frontier market economies; namely Botswana, Cape Verde, Ghana, Kenya, Mauritius, Mozambique, Namibia, Nigeria, Seychelles, South Africa, Tanzania, Uganda, Zambia, Zimbabwe, Angola and Senegal.

The third stage unravelled the thirteen (13) resource-rich countries by type of natural resource and analysed the extent to which natural resource availability is a lead indicator of foreign direct investment in Sub-Saharan Africa covering a period of 25 years (from 1985 to 2009).[7]

Compared with other countries in Sub-Saharan Africa, the emerging and frontier market economies have developed and deregulated their domestic financial markets, reduced restrictions on external capital flows and offered competitive investment environments to attract investments. One of the objectives for these initiatives is to attract greater inflows of foreign capital. According to the definition of the International Monetary Fund (IMF), emerging markets refer to economies with financial and capital markets that are beginning to bear the features of matured stock markets in advanced countries. Other hall marks of emerging market economies include the achievement of a stable macroeconomic environment, strong economic growth, substantial international reserves and low debt ratio. Emerging markets have attracted the interest of investors because of the prospect of high returns and usually have sufficient financial infrastructure, but have less liquid equity and debt markets than the advanced economies. By this categorisation, South Africa is the only country that is considered as a truly emerging market economy in South Africa. Frontier market economies, on the other hand, refer to a group of low and middle income economies with financial and capital markets that have started gaining the attention and interest of foreign investors. They exhibit a relative openness to and accessibility for foreign investors, but the financial sectors are still small and exhibit low liquidity. They are in the early stages of financial market development, but the continued existence of market restrictions makes it difficult for them to be classified as truly emerging markets, and they are usually referred to as second-generation emerging market economies (International Monetary Fund, 2008). By this categorisation, Botswana, Cape Verde, Ghana, Kenya, Mauritius, Mozambique, Namibia, Nigeria, Seychelles, Tanzania, Uganda, Zambia, Zimbabwe, Angola, and Senegal are considered as the frontier market economies in Sub-Saharan Africa.

[7] The 13 resource-rich countries are made of 7 oil-rich and 6 non-oil resource-rich countries. The 7 oil-rich countries are Angola, Nigeria, Gabon, Equatorial Guinea, Congo Republic, Chad and Cameroon. The 6 non-oil resource rich (mainly mineral-rich) countries are Botswana, Cote d'Ivoire, Guinea, Sierra Leone, Namibia and Zambia.

The other 21 selected countries are largely a control group, without deregulations and the sophistications of financial markets found in the group of emerging and frontier market economies. For most of these countries, financial and capital markets are highly regulated, very small and illiquid, and a large part of debt and portfolio equity inflows are still subject to comprehensive de jure controls.

The rationale for collecting data on the diverse category of countries in the sub region for the study is to help investigate the importance of the emerging and frontier market economies in attracting international capital flows to Sub-Saharan Africa. Another justification for the sample selection is to test the extent to which natural resource availability is a lead indicator of foreign direct investment. Data constraints also informed the choice of sample of 37 countries, including the 16 emerging and frontier market economies for the regression analysis. Data on foreign capital flows were obtained from the IMF's International Financial Statistics. Data on the ratio of external trade to GDP, ratio of fuel exports to total exports, share of credit to private sector in GDP and index for institutionalised democracy were obtained from the World Bank's World Development Indicators 2010. The United States' 3-year bond and 3-months Treasury bill rates were obtained from the IMF's *Global Economic Outlook* (various issues). Data on the weighted conflict index for the political environment was obtained from the Databanks International. An index for regionalism was constructed using information on active membership of active regional blocs obtained from the United Nations Conference on Trade and Development's *Economic Development in Africa 2009 Report*. The construction of the index for external capital accounts liberalisation and domestic financial openness involved sourcing qualitative data from the IMF's Annual Reports on Exchange Arrangements and Exchange Restrictions and from the IMF African Department respectively. The study period is from 1975 to 2009 for the sample of 16 emerging and frontier market economies and from 1980 to 2009 for the entire of 37 SSA countries.

Definitions and measurement of international capital flows and the other variables chosen for the study are provided in this section of the study and are based on a review of existing literature. An overview of the basic underlying theories and review of existing empirical studies suggests that conceivable propositions can be considered regarding a large number of potential determinants.

However, this study focuses on the impacts of types of financial liberalisation and regionalism on international capital flows in the selected countries. It builds on the work of Reinhardt et al. (2010).

2.5.1 Measures of international capital flows

The volume of international capital flows is measured as the percentage share of international capital inflows (that is the sum of foreign direct investment, external debt and portfolio investment inflows) in GDP. The indicator reflects the de facto quantity-based measure of the evolution of international financial integration and allows for cross-country comparison.

2.5.2 Financial liberalisation

The criteria for determining the extent of liberalisation of the domestic financial sector and the external capital accounts transactions are presented in Tables 2.1 and 2.2.

Table 2.1: Criteria for determining extent of domestic financial liberalisation

Criteria for full liberalisation
1. Domestic interest rates
No regulatory restrictions are imposed on the lending and deposit (borrowing) rates. In other words, there are no maximum and minimum rates imposed on lending and borrowing activities. Interest rates are largely determined by existing market conditions
2. Non-price indicators
There are possibly no direct controls on credit allocation. In addition, holding of deposits in foreign currencies are possibly permitted.
Criteria for partial liberalisation
1. Domestic interest rates
There are regulatory restrictions on either lending or borrowing rates. In other words, maximum and minimum rates are imposed on either lending or borrowing activities.
2. Non-price indicators
Controls on certain credit allocations or subsidies to certain sectors might exist. In addition, holding of deposits in foreign currencies might not be permitted.
Criteria for no liberalisation
1. Domestic interest rates
There are controls on lending and deposit (borrowing) interest rates. In other words, maximum (ceilings) and minimum (floors) rates are imposed on lending and borrowing activities.
2. Non-price indicators
There are possibly controls on the allocation of credit or subsidies to certain sectors on the economy. Holding deposits in foreign currencies are possibly prohibited.

Note: Sourced from Kaminsky and Schmukler (2003).

Table 2.2: Criteria for determining extent of capital account liberalisation

Criteria for full liberalisation
1. Overseas borrowing by banks and other corporations
In most cases, banks and other institutions are free to borrow from overseas, and the required minimum maturity should not exceed two years. It may be necessary for them to inform authorities, however, authorisation is granted automatically in most cases. Reserve requirements may be imposed, but at rates lower than 10 per cent.
2. Inward foreign direct investments
Most economic activities are open to foreign investments. Foreign residents are also permitted to hold over fifty per cent of shares of enterprises' equity capital in the targeted sectors. In addition, there are no special screening and discriminatory approval procedures. Moreover, foreign nationals are mostly free to get involved in the management and operational controls in these businesses without restrictions.
3. Purchases by foreign investors in domestic equity markets
There are no restrictions on foreign investors' acquisition of domestic equity
4. Multiple exchange rate system
No special exchange rates are applied to either the current accounts or capital accounts transactions
Criteria for partial liberalisation
1. Overseas borrowing by banks and other corporations
Banks and other institutions are permitted to borrow from overseas, but certain restrictions are imposed on such borrowing. The required minimum maturity range between two to five years. There might be some limits set on borrowing and certain regulatory requirements applicable to specific sectors. Reserve requirements range between 10 and 50 per cent.
2. Inward foreign direct investments
Some economic activities are open to foreign investments, but foreign residents are permitted to hold less than fifty per cent of shares of enterprises' equity capital in the targeted sectors. In addition, there are special screening and discriminatory approval procedures. Moreover, there are restrictions on foreign nationals' involvement in management and operational controls in these businesses.
3. Purchases by foreign investors in domestic equity markets
Foreign investors are permitted to hold less than fifty per cent of outstanding equity of each enterprise. There might be restrictions on investing in certain sectors.
4. Multiple exchange rate system
Special exchange rates apply to current account and capital account transactions.
Criteria for no liberalisation
1. Overseas borrowing by banks and other corporations
Overseas borrowing by banks and other corporations, in most instances, not permitted. The required minimum maturity might exceed five years. There might be limits set on borrowing and substantial regulatory requirements applicable to specific sectors. Reserve requirements exceed fifty per cent.
2. Inward foreign direct investments
Most economic activities are not open to foreign investments. Foreign residents are either prohibited or permitted to have less than fifty per cent ownership of enterprises' equity capital in the targeted sectors. In addition, there are special screening and discriminatory approval procedures. Moreover, there are restrictions on foreign nationals' involvement in management and operational controls in these businesses.
3. Purchases by foreign investors in domestic equity markets

Foreign residents are not permitted to invest in domestic equity
4. Multiple exchange rate system
Special exchange rates apply to current account and capital account transactions.

Note: Sourced from Kaminsky and Schmukler (2003) and Koyama and Golub (2006).

The value '3' is assigned when there is full liberalisation; '2' is assigned when there is partial liberalisation; and '1' is assigned when there is high restriction. In this study, the impacts of domestic financial liberalisation and capital accounts liberalisation on international capital flows are examined. In addition, the separate impacts of the liberalisation of overseas borrowing, inward foreign direct investments and foreigners' acquisition of domestic equity, as well as the elimination of multiple exchange rate practices, on international capital inflows are also analysed.

2.6 Estimation Results

A causality test was done to determine the causal relationship between international capital flows and the different aspects of financial liberalisation. The test results indicate that the direction of causality does not run from international capital flows to the different aspects of financial liberalisation (see Tables A2.1 and A2.2). This implies that the volume of international capital flows is not necessarily the cause of the implementation of the different types of financial liberalisation for the entire sampled countries. It also confirms that the determination of the policy of financial liberalisation is at least weakly exogenous. The one-step system robust (sandwich) variance estimator was used for regression analysis. In this section, results from the estimation of the model for the 37 selected SSA countries (including the 16 emerging and frontier market economies) and estimation of the model for the 16 SSA emerging and frontier market economies are reported. The estimation results for equations 2.1 and 2.2 are respectively presented in Tables 2.3 and 2.4. Table 2.5 presents estimation results that included dummy for emerging and frontier market economies. Estimation results for 7 oil-rich and 6 non-oil resource-rich countries are reported in Table 2.6. The diagnostic tests for the specification indicate that the model is well specified. Results of the diagnostic tests are reported in the respective Tables. These are the Arellano-Bond test for autocorrelation, the Sargan test for the validity of use of instruments and the Wald test for joint significance. The new residuals for the specification are,

at times, auto-correlated of order 1, but not auto-correlated of order 2. The Sargan test results also confirm the validity of the over-identifying restrictions and use of the instruments. The Sargan test statistic is computed as the coefficient of determination multiplied by the number of observations from GMM-IV two-step estimation onto the set of exogenous variables. Its computation is based on the proposition that the residual term is uncorrelated with the set of instruments, which are in turn strictly exogenous. The statistic is asymptotically chi-squared with r-k degrees of freedom where r refers to the number of instruments and k represents the number of endogenous variables. The system estimator was combined with the sandwich variance estimator. The sandwich variance estimator produces unbiased estimates and is robust to some types of misspecifications.

Findings from the estimation results are presented as Tables 2.3, 2.4 and 2.5 below. The estimation results in Table 2.3 indicate that regionalism, external trade openness, natural resource endowment and short-term international interest rate are important determinants of international capital inflows in the total sample of 37 selected SSA countries. The results for the sample of 16 emerging and frontier market economies, however, indicate that domestic financial liberalisation, capital accounts liberalisation and regionalism are important factors explaining the attraction of foreign capital inflows in the sample selection of 16 emerging and frontier market economies. Other important determinants of international capital inflows identified in the study for the sample selection of 16 emerging and frontier market economies are domestic financial depth, external trade openness and international interest rate. Also, there is evidence of strong agglomeration effect in all the specifications. The estimation results in Table 2.4 indicate that the different parts of capital accounts liberalisation are important determinants of international capital flows in the 16 emerging and frontier market economies, but not important in explaining international capital inflows in the entire sample of 37 countries (see Table 2.4). The estimation results reflect the fact that domestic financial liberalisation and capital accounts liberalisation are of little relevance in the attraction of international capital flows in the 21 SSA countries, not classified as emerging and frontier market economies.

The estimation results presented in Table2.3 indicate that the coefficient for the aggregated index for capital accounts liberalisation is positively signed and statistically significant in the

specification for the 16 emerging and frontier market economies only. This suggests that reforms to regulatory restrictions on external capital accounts transactions are effective only in the emerging and frontier market economies. The absence of overwhelming evidence on the effectiveness of regulatory reforms for the entire sample of 37 countries simply reflects the inability of most SSA countries to maintain the needed administrative and institutional infrastructure for enforcement of the regulations (see Ostry et al., 2010). Also, the imposition or strengthening of regulatory restrictions on international capital flows had, in the past, formed part of a broad set of policy responses, making it impossible to clearly separate their effects. In addition, certain unique characteristics of emerging and frontier market economies, including the achievement of high economic growth rates, the development of domestic financial markets and improvement in the institutional environment, account for their relative success with financial liberalisation. The estimation results, presented in Table 2.4, show dissimilarities in the impact of the different types of capital accounts liberalisation on the volume of international capital flows. The estimated coefficients for FDI and equity market liberalisation are positively signed and statistically significant in the specifications for both aggregated and disaggregated capital flows in the 16 SSA emerging and frontier market economies only. The coefficient for multiple exchange rate practices is however statistically significant in the specifications for both group samples. This means that reforms to regulatory restrictions on FDI and domestic equity markets are effective instruments for the management of the volume of international capital flows in the SSA emerging and frontier market economies only. Reforms to exchange rate system are also effective instruments for influencing the volume of foreign capital inflows in the entire sample of 37 SSA countries.

The influence of domestic financial sector deregulation on international capital flows is also significant in the emerging and frontier market economies. The signs of the coefficients for domestic financial sector deregulation conform to *a priori* expectations. The results imply that easing restrictions on domestic financial sector activities makes emerging and frontier market economies attractive to foreign investors.

Efforts by SSA countries to institute active regional blocs have only been effective in promoting cross-border direct investment flows. The coefficient for the regionalism index is positively

signed and statistically significant in the specifications for FDI only (see Table 2.4). One explanation for this is the small size of most African markets which serves as a deterrent to foreign investment. Another explanation for this is that a number of SSA countries have active membership of more than one regional bloc. The multiple memberships imply that member countries have to deal with the issue of contrasting objectives, divergent strategies for liberalising investments and trade, and opposing sets of laws and administrative processes. Other key determinants of international capital flows identified in the study are increased domestic financial depth and political institutions in the emerging and frontier market economies, natural resource availability for FDI inflows, external trade openness and changes in international interest rates. Estimation results in Table 2.3 show that increased domestic financial depth, institutionalised democracy and reductions in international long-term interest rates in advanced countries contribute significantly and positively to the attraction of international capital flows in emerging and frontier market economies. The signs of their respective coefficients conform to *a priori* expectations. The exception is the significant but negative correlation between domestic financial depth and FDI inflows in the emerging and frontier market economies. This could be explained by the fact that the domestic financial markets in the emerging and frontier market are still shallow and illiquid, which causes FDI inflows to by-pass the domestic financial markets. The estimation results show that international short-term interest rate is an important global factor that influences the movement of international capital to SSA (see Tables 2.3 and 2.4). The estimation results in Table 2.5 indicate that growth in GDP per capita is positively signed and statistically significant in the specification for non-FDI inflows in the 37 selected countries. This suggests that economic growth reduces risks, boosts returns on investments and consequently attracts foreign investments to SSA. Lastly, the dummy variable for emerging and frontier market economies in the specification for 37 selected SSA countries is also statistically significant and positively signed. The results show an important role played by the emerging and frontier market economies and confirm their dominance in attracting foreign capital to SSA.

Table 2.3: Foreign capital inflows (% GDP) in selected SSA countries

	Total sample: 37 selected SSA countries			16 emerging and frontier market economies		
	Foreign capital inflows	FDI inflows	Non-FDI inflows	Foreign capital inflows	FDI inflows	Non-FDI inflows
1ST order lag dependent variable	0.066 (0.55)	0.018 (0.32)	0.186*** (3.23)	-0.168 (-0.40)	0.345*** (3.07)	0.299*** (3.77)
Domestic financial liberalisation index (one period lag)	0.236 (0.15)	-1.113 (-0.65)	0.867 (0.88)	0.872* (1.76)	0.921** (2.87)	0.847* (1.73)
Capital accounts liberalisation index (one period lag)	-0.053 (-0.10)	-2.164 (-0.50)	1.305 (1.36)	0.905 (1.10)	1.426* (1.99)	0.471 (0.46)
Regionalism index (one period lag)	-2.902** (-2.02)	-1.542 (-1.05)	-1.101 (-1.31)	-0.993 (-0.99)	0.846* (1.76)	-1.449 (-1.14)
Domestic credit to private sector (% GDP) [one period lag]	0.119 (1.18)	0.066 (0.74)	0.072 (1.39)	0.573 (0.86)	-0.549* (-1.99)	3.582** (2.48)
External trade (% GDP) [logarithmic values]	0.287*** (5.02)	0.342*** (3.34)	0.026** (2.41)	0.076 (0.74)	3.728*** (3.28)	1.389 (0.36)
Index for institutionalised democracy	0.957 (0.50)	-0.629 (-0.32)	-0.555 (-0.71)	0.119 (0.76)	0.091** (2.46)	0.010 (0.87)
Share of fuel exports in total exports (%)		0.452* (1.97)				
U.S. long term interest rate		-0.377 (-0.74)			-0.095** (-2.50)	
U.S. short term interest rate	-0.683* (-1.92)		-0.493* (-1.79)	-0.401* (-1.93)		-0.697* (-1.79)
2007/2009 crisis global financial dummy	-1.732 (-1.39)	-1.152 (-0.72)	-1.531 (-0.32)	-0.832 (-0.10)	-1.474 (-1.57)	-1.764 (-1.52)
Serial correlation test (1st order)	0.005	0.184	0.001	0.442	0.013	0.026
Serial correlation test (2nd order)	0.566	0.340	0.479	0.310	0.772	0.248
Number of observation	979	965	975	426	426	402
Number of cross sections	37	37	37	16	16	16

*Note: Estimation of all equations included time dummies, not shown here. The t-statistics are in parentheses. ***, **, and * indicate significance at 1, 5 and 10% respectively. Foreign capital inflows = FDI inflows + external debt inflows + portfolio investment inflows. FDI inflows are direct investments in productive assets by foreign companies or entities. Non-FDI = external debt + portfolio investment inflows.*

Table 2.4: Foreign capital inflows (% GDP) in selected SSA countries

	Total sample: 37 selected SSA c'tries			16 emerging and frontier market economies		
	Foreign capital inflows	FDI inflows	Non-FDI inflows	Foreign capital inflows	FDI inflows	Non-FDI inflows
1ST order lag dependent variable	0.265*** (3.79)	0.348*** (5016	0.224*** (2.86)	0.353*** (6.06)	0.620*** (5.23)	0.527*** (5.23)
Liberalisation of FDI inflow (one period lag)	0.019 (0.01)	2.149 (0.93)	-1.122 (-0.44)	2.901* (1.80)	1.663* (1.82)	1.737 (1.09)
Deregulation of external borrowing (one period lag)	3.581 (1.17)	-0.169 (-0.18)	4.352 (1.55)	1.891 (0.30)	-0.629 (-0.72)	0.441 (0.10)
Reduction in multiple exchange rate practices	3.267* (1.84)	1.423*** (2.61)	2.043** (2.32)	2.047* (1.76)	1.930* (1.66)	2.281 (1.11)
Equity market liberalisation index (one period lag)	-2.361 (-0.81)	-0.485 (-0.29)	-2.091 (-1.11)	-1.013 (-1.35)	-0.819 (-1.50)	2.981* (1.78)
Domestic financial liberalisation index (one period lag)	1.390 (1.04)	0.322 (0.26)	0.010 (-0.10)	2.418 (1.32)	-1.506*** (-3.05)	2.021 (1.24)
Regionalism index (one period lag)	-1.405 (-0.72)	0.172* (1.69)	-0.392 (-0.76)		1.446** (2.12)	-1.553 (-0.45)
U.S. long term interest rate		-1.173 (-1.15)			-0.102*** (-3.72)	
U.S. short term interest rate	-0.590** (-2.25)		-0.186* (-1.65)	-0.494*** (-2.25)		-0.388* (-1.76)
Dummy for year 2009		-1.986* (-1.67)				
Serial correlation test (1st order)	0.057	0.165	0.000	0.478	0.009	0.301
Serial correlation test (2nd order)	0.151	0.199	0.803	0.313	0.588	0.330
Number of observation	887	870	883	385	476	476
Number of cross sections	37	37	37	16	16	16

*Note: Estimation of all equations included time dummies, not shown here. The t-statistics are in parentheses. ***, **, and * indicate significance at 1, 5 and 10% respectively. Foreign capital inflows = FDI inflows + external debt inflows + portfolio investment inflows. FDI inflows are direct investments in productive assets by foreign companies or entities. Non-FDI inflows = external debt + portfolio investment inflows.*

Table 2.5: Foreign capital inflows in 37 selected SSA countries

	Foreign capital inflows (% GDP)	FDI inflows (% GDP)	Non-FDI inflows (% GDP)
1ST order lag dependent variable	0.113** (2.33)	0.021 (0.13)	0.194*** (2.96)
Dummy for emerging and frontier market economies	10.368** (2.17)	-16.964 (-0.84)	8.400** (2.26)
External trade (% GDP)	0.191*** (4.40)	0.315*** (3.93)	
Political climate (weighted conflict index)	-0.078 (-0.17)	0.081 (0.26)	0.212 (1.09)
Growth in GDP per capita (one period lag)			0.100** (2.41)
Natural resource availability – share of fuel exports in total exports (%)		0.475** (2.17)	
U.S. long term interest rate	-0.684 (-1.42)	0.070 (0.11)	
U.S. short term interest rate			-0.143 (-0.59)
Serial correlation test (1st order)	0.079	0.230	0.001
Serial correlation test (2nd order)	0.548	0.344	0.405
Number of observation	980	966	901
Number of cross sections	37	37	37

*Note: The two-step system robust (sandwich) variance estimator was used to correct for remaining biases associated with some types of misspecifications. Estimation of all equations included time dummies, not shown here. The t-statistics are in parentheses. ***, **, and * indicate significance at 1, 5 and 10% respectively*

Reforms to regulatory restrictions on external borrowing and political conflict were not found to be important determinants of international capital flows in any of the specifications for the entire sample of 37 SSA countries and in most specifications for emerging and frontier market economies. Also, there was no significant reduction in international capital flows during the period of the recent financial and economic crisis, with the exception of the significant reduction in FDI inflows in 2009, shown in Table 2.4.

Table 2.6 shows estimation results for FDI inflow to selected oil and non-oil resource-rich (mainly mineral-rich) countries. The results confirm the important contribution of natural resource availability to the attraction of foreign direct investment FDI flows to the selected oil-rich and non-oil resource-rich countries in Sub-Saharan Africa. The positively signed and

statistically significant coefficients for oil and mineral exports suggest that an important part of FDI inflows to SSA is resource-based.

Table 2.6: FDI inflow to selected SSA resource-rich countries

	7 Oil-resource-rich countries		**6 non-oil resource-rich (mineral-rich) countries**	
	One-step system estimator	OLS estimator	One-step system estimator	OLS estimator
1ST order lag dependent variable	0.114* (1.80)	0.121 (1.12)	0.360*** (6.11)	0.669*** (6.17)
External capital accounts liberalisation index [one period]	5.414 (1.54)	8.502*** (2.94)	-0.568 (-1.31)	0.298 (1.24)
Regionalism index	-4.405 (-1.03)	3.278 (0.97)	1.021 (1.11)	1.224 (1.39)
Institutionalised democracy index	0.041 (0.59)	0.077 (0.82)	0.001 (0.05)	0.004 (0.44)
Domestic credit to private sector (% of GDP) [one period lag]	0.596 (1.19)	0.031 (0.08)	-0.021 (-0.20)	-0.054** (-2.13)
Crude oil exports (% of total exports)	0.612** (2.55)	0.289*** (3.88)		
Mineral exports (% of merchandise exports)			0.038** (2.14)	0.017** (2.30)
External trade (% of GDP)	0.437*** (5.29)	0.296*** (6.12)	0.322*** (3.21)	0.221*** (4.11)
U.S. long term interest rate	-1.258* (-1.68)	-1.992 (-0.23)	-6.252* (-1.72)	-1.794** (-2.38)
Serial correlation test (1st order)	0.087		0.035	
Serial correlation test (2nd order)	0.260		0.363	
Sargan / Hansen test	1.000		1.000	
Wald test: Prob>chi^2	0.000		0.000	
Adjusted R-squared		0.422		0.511
Number of observation	150	159	120	131
Number of cross sections	7	7	6	6

*Note: Estimation of all equations included time dummies, not shown here. The t-statistics are in parentheses. ***, **, and * indicate significance at 1, 5 and 10% respectively.*

2.7 Conclusions and Recommendations

In this study the impact of types of financial liberalisation, regionalism and other key controlling factors, on international capital flows in selected Sub-Saharan African countries was examined.

Findings from the study confirm the hypothesis that the liberalisation of external capital accounts is an important prerequisite for attracting international capital flows in emerging and developing economies. The findings are consistent with results obtained by Delechat et al. (2009) and Ahmed et al. (2005). In particular, FDI liberalisation, equity market liberalisation and reductions in multiple exchange rate practices were found to be the main types of capital accounts liberalisation that influence international capital flows in SSA emerging and frontier market economies. Also, the estimated results validate the proposition that domestic financial liberalisation is an important determinant of cross-border capital movement in SSA emerging and frontier market economies. This applies, particularly, to the attraction of foreign direct investments. Additionally, the estimated results validate the assumption that the liberalisation of different aspects of international capital flows affects overall international investment inflows in different ways. Further, there is some evidence to support the hypothesis that regionalism contributes significantly and positively to the achievement of international financial integration in developing countries. However, this applies only to the attraction of FDIs.

Other determinants of international capital flows are increased domestic financial depth, increased openness to external commodities trade, institutionalised democracy, natural resources endowment, higher economic growth rates and developments in international interest rates. The study also confirms the hypothesis that emerging and frontier market economies play a dominant role in attracting international capital flows to SSA.

Consequently, conclusions drawn from the studies on emerging and frontier market economies and 21 other selected countries in Sub-Saharan Africa offer useful lessons for countries in the region that have been less successful with attracting foreign investments. A number of measures can be recommended for the promotion of foreign investments. Firstly, there is a need for countries in sub-Saharan Africa to recognize the importance of reforms to regulatory restrictions

in promoting greater inflows of foreign capital. In particular, the liberalisation of FDI inflows and domestic equity markets serve as effective instruments for the attraction of international capital flows in countries with adequately developed domestic financial markets. The elimination of multiple exchange rate practices also creates an incentive for foreign investments. Regulatory restrictions that remain in place can only be effective if countries take measures to develop the needed administrative and institutional infrastructure for enforcement of the regulations. Secondly, the 21 SSA countries that are not classified as emerging and frontier market economies must pursue pro-growth policies that will promote accelerated and sustainable growth. They must also take measures to reform and improve their institutional environment. Thirdly, the promotion of regional economic integration for increased cross-border investments requires the harmonisation of the objectives of different agreements, a reduction in the structure of overlapping agreements as well as their merger into fewer blocs or a single bloc. This recommendation is consistent with the suggestions raised in the IMF (1999) study report. Also countries that are more open to international commodities trade attract greater inflows of foreign investments, particularly export-oriented FDIs. Pro-growth policies of governments must also focus on production sectors with higher growth potentials to increase economic growth rates and the future profitability of investments. Lastly, reforms to political institutions toward greater democracy offer investment protection and create incentives for the attraction of greater inflows of international capital in countries that have taken significant steps toward the development of their domestic financial markets, and pursued pro-growth policies for the achievement of an accelerated and private sector-led economic growth.

The basic limitation of the study was the inadequacy of data on portfolio inflows to allow for a further disaggregation of the foreign capital inflow for the period covering 1975 to 2009. The findings of the study offer some directions for future research on the topical issues dealt with in this study. First, future extensions to the study could be focused on unravelling the time effects of the liberalisation. Also, future research can be directed at disaggregating the regionalism index to capture the separate impacts of regional trade integration and regional financial liberalisation, with focus on a larger sample of countries in the sub-region. In addition, further extensions of the research can be directed at investigating the impact of other institutional, regulatory and macroeconomic reforms on international capital follows to the selected countries

that are not classified as emerging and frontier market economies. In addition, future research could also focus on the direct impact of the development and active membership of regional blocs on the achievement of regional financial integration, with emphasis on the volume of regional cross-border capital flows. Finally, future studies could assess the extent to which the discovery of natural resources attracts foreign direct investment in SSA.

2.8 References

Acemoglu, P., Johnson, S. and Robinson, J. (2004): "Institutions as the fundamental cause of long-run growth", *NBER Working Paper* 10481. (Cambridge, Massachusetts: National Bureau of Economic Research).

Agenor, P. R. (2003): "Benefits and costs of international financial integration: theory and facts", *World Economy* 26(8), 1089-1118.

Ahmed, F., Arezki, R. and Funke, N. (2005): "The composition of capital flows: Is South Africa different?" IMF Working Paper 05/40 (Washington: International Monetary Fund)

Alfaro, L., Kalemli-Ozcan, S. and Volosovych, V. (2008): "Why doesn't capital flow from rich to poor countries?: An empirical investigation", *Review of Economics and Statistics* 90(2), 347-368.

Alfaro, L., Kalemi-Ozcan, S. and Volosovych, V. (2003), "Why doesn't capital flow from rich to poor countries?: An empirical investigation", *Working Paper* 040 (Boston, Massachusetts: Harvard Business School).

Anderson, T. W. and Hsiao, C. (1982): "Formulation and estimation of dynamic models using panel data", *Journal of Econometrics* 18, 47-82.

Arellano, M. and Bond, S. (1991): "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations." *Review of Economic Studies* 58, 277-297.

Arellano, M. and Bover, O. (1995): "Another look at the instrumental variable estimation of the error-components models", *Journal of Econometrics* 68(1), 29-51.

Asiedu, E. (2002): "On the determinants of foreign direct investment to developing countries: Is Africa different?", *World Development* 30(January), 107-19.

Asiedu, E. Lien, D (2004): "Capital controls and foreign direct investment," *World Development* 32(March), 479-490.

Bacchetta, P. (1992): "Liberalisation of capital movements and of the domestic financial system," *Economica* 59(236), 465-474.

Bacchetta, P., and van Wincoop, E. (1998): "Capital flows to emerging markets: liberalization, overshooting and volatility", *NBER Working Paper* No. 6530.

Baldwin, R. E. (1997): "Review of theoretical developments on regional integration," in O. Ademola, I. Elbadawi, and P. Collier (eds.), *Regional integration and trade liberalization in Sub-Saharan Africa*, London: MacMillan Press Ltd.

Blundell, R., and Bond, S. (1998): "Initial conditions and moment restrictions in dynamic panel data models", *Journal of Econometrics* 87, 115-143.

Calvo, G., Leiderman, L. and Reinhart, C. (1993): "Capital inflows and real exchange rate appreciation in Latin America: The role of external factors", *IMF Staff Papers* 40(March), 108-151.

Chuhan, P., Stijn, C. and Nlandu, M. (1998): "Equity and bond flows to Latin America and Asia: The role of global and country factors", *Journal of Development Economics* 55(April), 439-463.

Commonwealth Secretariat: "Promoting private capital flows and handling volatility: role of national and international policies," *Economic Paper 34*, December 1997 (Commonwealth Secretariat: London)

Dasgupta, D., and Ratha, D. (2000): "What factors appear to drive private capital flows to developing countries?, And how does official lending respond?", *World Bank Working Paper* 2392. The World Bank: Washington, D. C.

Delechat, C. Ramirez, G., Wagh, S. and Wakeman-Linn, J. (2009): "Sub-Saharan Africa's integration in the global financial markets", *IMF Working paper* 09/114, May: International Monetary Fund.

Edison, H. and Reinhart, C. M. (2001): "Stopping hot money", *Journal of Development Economics* 66(2), 533-553.

Edwards, S. (1999): "How effective are capital controls?", *Journal of Economic Perspectives* 13(4), 65-84.

Eichengreen, B. (2003): *Capital Flows and Crisis.* Cambridge: the MIT Press.

Fernandez-Arias, E. (1996): "The new wave of private capital inflows: push or pull?" *Journal of Development Economics* 48, 389-418.

Forbes, K. (2007): "The microeconomic evidence on capital controls: no free lunch," in S. Edwards (eds.), *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices and Consequences*, Cambridge: National Bureau of Economic Research.

Furstenberg, V. G. M. (1998): "From worldwide capital mobility to international financial integration: a review essay", *Open Economies Review* 9(1998), 53-89.

Garcia-Herrera, A. and Wooldridge, P. (2007): "Global and regional financial integration: progress in emerging markets", *BIS Quarterly Review*, September 2007, 57-70.

Hernandez, L. Mellado, P. and Valdes, R. (2001): "Determinants of private capital flows in the 1970s and 1990s: Is there evidence of contagion?" *IMF Working Paper 01/64*, International Monetary Fund: Washington, D. C.

International Monetary Fund, Balance of Payments Statistics (various issues).

International Monetary Fund (2011): "Capital inflows to frontier markets in Sub-Saharan Africa: Recovery and new risks", in *Regional Economic Outlook: Sub-Saharan Africa,* 25-50. Washington DC: International Monetary Fund. April 2011.

International Monetary Fund (2008): "Private capital flows to Sub-Saharan Africa: Financial globalization's final frontier?", in *Regional Economic Outlook: Sub-Saharan Africa*, 45-73. Washington DC: International Monetary Fund. April 2008.

International Monetary Fund (1999): "The cross-border initiative in Eastern and Southern Africa", African and Policy Development and Review Department, the IMF

Ishii, S. and Habermeier, K. (2002): "Capital account liberalisation and financial stability", *Occasional Paper* 211, 5-17. Washington DC: International Monetary Fund. 2002.

Kamaly, A. (2002): "Behind the surge in FDI to developing countries in the 1990s: An empirical investigation", unpublished, University of Maryland: College Park, Maryland.

Kaminsky, G. and Schmukler, S. L. (2003): "Short-run pain, long-run gain: The effects of financial liberalisation," *IMF Working Paper* No. 03/34, the IMF: Washington, DC.

Koyama, T. and Golub, S. (2006): "OECD's FDI regulatory restrictiveness index: Revision and extension to more economies", *OECD Working Papers on International Investment No. 2006/4,* Organisation for Economic Co-operation and Development: France.

Lane, P. R. and Milesi-Ferretti, G. M. (2003): "International Financial Integration", *Institute for International Integration Studies Discussion Paper* No.03, July. Institute of International Integration Studies: Dublin.

Lin, J. and Nugent, J. (1995): "Institutions and economic development", in J. Bechsman and T. Srinivasan (eds.), *Handbook of economic development* 3, North Holland.

Lucas, R. E. (1990): "Why doesn't capital flow from rich to poor countries?" *American Economic Review* 80(2), 92-96.

Morisset, J. (2000): “Foreign direct investment in Africa: Policies also matter”, *Policy Research Working Paper No. 2481*, The World Bank and the International Finance Corporation: Washington, D.C.

Morrison, A. D., and White, L. (2004): “Financial liberalisation and capital regulation in open economies”, *Oxford Financial Research Centre Working Paper* 2004-FE-10

Ndulu, B. J. and O'Connell, S. A. (1999): “Governance and growth in Sub-Saharan Africa”, *The Journal of Economic Perspectives* 13, 41-66.

North, D. C. (1990): *Institutions, institutional change and economic performance*. New York: Cambridge University Press.

Obstfeld, M. and Taylor, A. M. (2004): *Global capital markets: Integration, crisis and growth*. Cambridge, United Kingdom: Cambridge University Press.

Ostry, J. D., Atish R., Ghosh, K. H., Chamon, M., Qureshi, M. S. and Reinhardt, D. B. S. (2010): “Capital Inflows: The Role of Controls”, *IMF Staff Position Note* 2010/04

Prasad, E., Rogoff, K., Shang-Jin W., and Kose, A. M. (2003): “Effects of financial globalization on developing countries: Some empirical evidence”, *IMF Occasional Paper 220*, March 2003. International Monetary Fund: Washington, D.C.

Prasad, E., Kose, A. M., Rogoff, K. and Shang-Jin, W. (2005): "Financial Globalization beyond the Blame Game", *Finance and Development* 44(1), 9-13.

Reinhardt, D., Ricci, A. L., Tressel, T., (2010): “International Capital Flows and Development: Financial Openness Matters”, *IMF Working Paper* 10/235.International Monetary Fund: Washington, DC.

Rodrik, D. (2000): “Institutions for high-quality growth: What they are and how to acquire them”, *Studies in International Comparative Development* 53, 3. Fall, 2000.

Rogoff, K. and Reinhart, C. (2003): "Foreign direct investments to Africa: the role of price stability and currency instability," *IMF Working Paper 03/10*. International Monetary Fund: Washington, DC.

Sompornserm, T. (2007): "Financial liberalisation and international capital flows", unpublished thesis, Claremont Graduate University

United Nations Conference on Trade and Development (2009): *Economic Development in Africa Report 2009- Strengthening Regional Economic Integration for Africa's Development,* Geneva: United Nations publications.

Vo, X. V. (2005): *Determinants of International Financial Integration*, School of Economics – University of New South Wales.

Wakeman-Linn, J., and Wagh, S. (2008): "Regional financial integration: its potential contribution to financial sector growth and development in Sub-Saharan Africa", article presented at high-level seminar of the IMF institute in Tunis, Tunisia, March 4-5, 2008.

World Bank, World Development Indicators, various issues

Appendixes A2

Table A2.1: Panel causality test for 16 emerging and frontier market economies

Null hypothesis	No. of observation	F-statistic	Probability
(1) FDI liberalisation does not Granger cause foreign capital inflow	470	2.011	0.122
(2) Foreign capital inflow does not Granger cause FDI liberalisation		0.121	0.790
(1) External borrowing deregulation does not Granger cause foreign capital inflow	470	2.101	0.112
(2) Foreign capital inflow does not Granger cause external borrowing deregulation		0.114	0.863
(1) Domestic interest rate liberalisation does not Granger cause foreign capital inflow	470	0.559	0.508
(2) Foreign capital inflow does not Granger cause domestic interest rate liberalisation		0.212	0.805
(1) Equity market liberalisation does not Granger cause foreign capital inflow	470	2.011	0.122
(2) Foreign capital inflow does not Granger cause equity market liberalisation		0.094	0.810
(1) Multiple exchange rate practices does not Granger cause foreign capital inflow	470	1.114	0.311
(2) Foreign capital inflow does not Granger cause multiple exchange rate practices		0.126	0.800
(1) Regionalism does not Granger cause foreign capital inflow	410	1.691	0.185
(2) Foreign capital inflow does not Granger cause regionalism		0.092	0.912

Note: Lags: 2 Sample: 1975 to 2009

Table A2.2: Panel causality test for 37 selected SSA countries

Null hypothesis	No. of observation	F-statistic	Probability
(1) External financial liberalisation does not Granger cause foreign capital flow	1036	0.323	0.724
(2) Foreign capital flow does not Granger cause external financial liberalisation		0.310	0.733
(3) Domestic financial liberalisation does not Granger cause foreign capital flow	1036	0.219	0.803
(4) Foreign capital flow does not Granger cause domestic financial liberalisation		0.639	0.528
(5) FDI liberalisation does not Granger cause foreign capital inflow	1036	0.253	0.777
(6) Foreign capital inflow does not Granger cause FDI liberalisation		0.376	0.687
(7) External borrowing deregulation does not Granger cause foreign capital inflow	1036	0.248	0.780
(8) Foreign capital inflow does not Granger cause external borrowing deregulation		0.394	0.675
(9) Equity market liberalisation does not Granger cause foreign capital inflow	1036	0.180	0.836
(10) Foreign capital inflow does not Granger cause equity market liberalisation		0.536	0.585
(11) Multiple exchange rate practices does not Granger cause foreign capital inflow	1036	0.127	0.881
(12) Foreign capital inflow does not Granger cause multiple exchange rate practices		0.210	0.810
(3) Regionalism does not Granger cause foreign capital inflow	1036	0.201	0.818
(4) Foreign capital inflow does not Granger cause regionalism		0.438	0.645

Note: Lags: 2 Sample: 1980 to 2009

Appendix A2.1:
Political Climate – weighted conflict index

Political conflict is conceived as eight features, namely, assassinations, general strikes, guerrilla warfare, major government crises, purges, riots, revolutions and anti-government demonstrations. The political conflict features are defined in turn.

1. Assassinations: any kind of politically motivated murder or attempted murder of a high government official or politician.
2. General strikes: mass strike of any kind by ordinary citizens, industrial or service workers and that involves employers, aimed at government policies or authority.
3. Guerrilla warfare: any armed activity carried out by independent groups of citizens, aimed at overthrowing the present regime.
4. Major government crises: any quick development that threatens the survival, and could cause the downfall, of the present regime.
5. Purges: any organised and systematic elimination of opponents within the ranks of the regime or the opposition, by means of jailing or execution.
6. Riots: Any form of violent demonstration or clash involving more than 100 citizens and the use of physical force.
7. Revolutions: Any forced or illegal change of the top government elite. It could be a failed attempt of any kind involving use of arms or a successful armed rebellion, aimed at independence from the central government.
8. Anti-government demonstrations: Any peaceful gathering in public of not less than 100 people with the main objective of showing their disapproval of government policies or opposing authority.

The eight features of political conflict and their respective assigned weights as of 2009 are presented in Table A2.3.

Table A2.3: Political climate features

	Weights
Assassinations	20
General strikes	20
Guerrilla warfare	100
Major government crises	20
Purges	20
Riots	25
Revolutions	150
Anti-Government demonstrations	10

Notes:The specific weights are variable and could be varied overtime.
Source: Databanks International 2010

The values of the index are re-scaled to the nearest 1000 unit. The outcome from this approach is a range of values for the index that begins from '0' and ends at 10.437. The value '0' indicates no conflict (a highly stable political climate) and values greater than '0' indicate the existence of some form of political instability or conflict. Higher values indicate higher levels of conflict or political instability.

Political institution – institutionalised democracy index

Political institution is measured by the degree of democracy. Democracy is conceived as three essential, mutually-dependent features or elements. The first feature is the existence of institutions and processes by which citizens can show effective preferences about alternative policies and leaders. The second feature is the existence of entrenched or established rules on the exercise of power by the executive. The third feature is the assurance of civil rights to all citizens in their everyday lives and in acts of political participation.

Three benchmark indicators are used in the computation of the democracy index. These are political participation, executive recruitment and constraints on the chief executive. An advanced democracy could be described as one in which (a) political participation is open and free; (b) recruitment of executive is by election, and (c) operational constraints on the chief executive are substantial. The indicator score is an 11-point additive scale (0-10). The value '0' indicates no democracy. Any value that is greater than '0' indicates some form of democracy. Higher values indicate higher levels of democracy.

CHAPTER THREE

EXPLAINING INTERNATIONAL EQUITY FLOWS IN SELECTED SUB-SAHARAN AFRICAN COUNTRIES

3.1 Introduction

International equity flows, made up of foreign direct investment and portfolio equity flows, offer huge potential benefits to recipient countries. One such benefit is that it augments capital for higher and sustainable economic growth and development in capital-deficient countries (Obstfeld, 1994; International Monetary Fund, 2008). As a result of the associated benefits, efforts are being made by countries in Sub-Saharan Africa to attract a greater inflow of foreign equity. However, equity flows to Sub-Saharan Africa have remained low and fluctuating. The World Bank's World Development Indicators (2010) show that foreign equity flows (as share of total GDP) declined from 5.66 per cent in 1998to 2.78 per cent in 2002, recovered in 2006 to 4.34 per cent, but declined again to 2.48 per cent in 2008.This raises an important issue and policy challenge for the region, namely, how to increase incentives for the attraction of greater foreign equity flows.

Theory, including the works of Lane and Milesi-Ferretti (2000), Gordon and Bovernberg (1996), Dasgupta and Ratha (2000), Furstenberg (1998) and Albuquerque (2003), postulate that several factors account for the dynamics of equity flows. These factors include financial liberalisation, asymmetric information, institutional quality, risks, human capital development, natural resource availability and economic growth cycles in advanced countries. There are several empirical studies that support the theoretical explanations on the determinants of international equity flows. These studies include those by Rogoff and Reinhart (2003) who identified inflation volatility and currency crises as determinants of equity flows, as well as Delechat et al. (2009), and Ahmed et al. (2005) which identified the institutional quality and risks as major determinants of international equity flows. Country case studies, including those by Wesso (2001) and Abdullah et al. (2006), have also investigated the short- and long-run determinants of international capital flows, and provided inconclusive results. However, studies that distinguish

between long- and short-run impacts of financial liberalisation on international capital flows are yet to be identified.

This study seeks to investigate the long- and short-run impacts of external financial liberalisation on international equity flows to selected Sub-Saharan African countries.[8] It also seeks to explore the bi-directional relationship between external financial liberalisation and equity flows in the selected countries. The contribution of this study to research is to investigate the distinction between long- and short-run impacts of external financial liberalisation on international equity flows.

The rest of the paper is organised as follows. The next section briefly discusses efforts by the two countries to liberalise their external financial sectors and the level of international equity inflows experienced overtime. Section three reviews literature that explains the impact of financial liberalisation and other potential determinants on international equity flows. Section four gives the sources and description of data used for the study, the working hypotheses, a brief discussion of variables used, and the estimation model for the study. The time-series estimation results for international equity flows are presented and discussed in section five. Finally, section six summarises the findings of the research and concludes the discussion by indicating the basic limitation of the study and offering some directions for future extensions of the research study.

3.2 Developments in South Africa and Nigeria

In South Africa, a comprehensive effort towards the liberalisation of the country's external capital accounts transactions began in 1995. Before this initiative, regulatory restrictions on international capital flows were provisionally lifted in 1983, but re-imposed in 1985 in response to the political upheaval and the decision by foreign banks to cut-off credit extensions to the country. In 1995, more consistent efforts were made to liberalise the country's external capital accounts transactions in the wake of favorable political developments in the early part of the

[8]The selected countries are South Africa and Nigeria. South Africa accounted for 90 per cent of total foreign portfolio equity flows to emerging and frontier market economies in sub-Saharan Africa in the 1990s. In addition, South Africa and Nigeria collectively accounted for 77.5 per cent of the total equity flows to emerging and frontier market economies in the sub-region between 2000 and 2008 (World Development Indicators, 2010).

1990s. Before the policy initiative, South Africa had put in place a sound domestic financial infrastructure. Then, in March 1995, the government liberalised its exchange rate regime and removed all controls on non-resident investors, giving them complete access to the nation's Stock and Bond Exchanges. Controls on residents were lifted much more gradually because of the country's weak international reserve position (Tswamuno, Pardee and Wunnava, 2007). Currently, South Africa has no controls on FDI inflows. However, restrictions on FDI outflows remain in place. In addition, residents are not allowed to sell or issue equity shares abroad, but have limited permission to purchase equity shares abroad. Furthermore, there are still controls on resident sale or issue of bonds abroad as well as resident purchases of foreign bonds and money market securities.

In Nigeria, the liberalisation of its external capital accounts transaction has been part of a broader economic reform process which was initiated in 1985 and later revived in 1995 by raising the amount of profit that could be repatriated and eliminating regulatory restrictions. Currently, there are no regulatory restrictions on FDI inflows and outflows as well as on equity share inflows and outflows. There are also no restrictions on long-term foreign borrowing and lending. However, controls on non-resident purchases of domestic money market securities and resident purchases of money market securities abroad remain in place (International Monetary Fund, 2008).

Table 3.1 show increases in the intensity of external financial liberalisation and the level of international equity inflows in both countries for the period 1995 to 1999 and from 2005 to2009. The trend suggest the existence of a relationship between reforms to regulatory restrictions on international capital flows and the average level of international equity inflows in both countries. Tables 3.2 and 3.3 also show a high positive correlation between external financial liberalisation and foreign equity inflows in both countries.

Table 3.1: Developments in South Africa and Nigeria

	South Africa			Nigeria		
Period	External financial liberalisation index[a]	Foreign equity inflow (U.S $ million)	Foreign equity inflow (% GDP)	External financial liberalisation index	Foreign equity inflow (U.S $ million)	Foreign equity inflow (% GDP)
1970-1974	1.38	286.32	1.55	1.00	285.20	2.35
1975-1979	1.38	-101.87	-0.34	1.00	354.03	2.03
1980-1984	1.38	174.96	0.42	1.00	157.53	0.93
1985-1989	1.38	-388.44	-0.67	1.30	710.45	5.93
1990-1994	1.21	61.14	0.12	1.30	1100.30	8.80
1995-1999	2.84	7253.42	6.28	2.08	1253.68	7.51
2000-2004	2.88	4273.69	4.68	2.38	1616.85	5.29
2005-2009	2.91	12516.60	6.63	2.38	6929.95	8.55

Source: the World Bank's World Development Indicators, 2010 and the International Monetary Fund's Annual Report on Exchange Arrangements and Exchange Restrictions.
Note :[a] The liberalisation index is calculated using the Kaminsky-Schmukler chronology (see Appendix A2 of the previous chapter for details)

Table 3.2: Pairwise Correlation Coefficient

South Africa			
	External financial liberalisation index	Foreign equity inflow (U.S. $ million)	Foreign equity inflow (% GDP)
External financial liberalisation index	1.000		
Foreign equity inflow (U.S. $ million)	0.812 (0.000)	1.000	
Foreign equity inflow (% GDP)	0.823 (0.000)	0.853 (0.000)	1.000
Nigeria			
External financial liberalisation index	1.000		
Foreign equity inflow (U.S. $ million)	0.644 (0.000)	1.000	
Foreign equity inflow (% GDP)	0.446 (0.004)	0.558 (0.000)	1.000

Note: The probability ratios are in parentheses.

3.3 Literature review

3.3.1 External financial liberalisation and foreign equity flows

External financial liberalisation basically refers to the easing of regulatory restrictions on external capital accounts transactions. In the finance and development literature, the importance of official restrictions and regulations in influencing international capital flows is emphasised.

For instance, Furstenberg (1998) and Prasad et al. (2003) consider the relaxation of regulatory restrictions on capital flows as an essential pre-requisite for the actual realisation of increased flows. The liberalisation policies affect the decisions of foreign and domestic investors to allocate their funds domestically and abroad because of the influence of the policies on prices, transaction costs, returns on assets and quantitative limits set on ownerships and investments. Hence, financial liberalisation affects the volume and composition of international capital flows (Lane and Milesi-Ferretti, 2003).

Theoretical studies, including the works of Bacchetta and van Wincoop (2000), also explain the impact of external financial liberalisation on the dynamics of international capital flows, in a broad framework which assumes that foreign capital flows are subject to transaction and installation costs. In the model, liberalisation may be classified as being well-known and definite or doubtful and uncertain. Well-known or expected liberalisations lead to rapid increase in inflows which then shrinks off. An uncertain or doubtful liberalisation leads to a marginal increase in international capital inflows at the initial stages, but increases inflows significantly once the problem of uncertainty is dealt with. Edison and Warnock (2006) define external financial liberalisation as constituting external capital account liberalisation and equity market liberalisation which includes international cross-listing of equity. They argue that reforms to regulatory restrictions on external capital accounts transactions are uncertain and reversible. Examples of external capital accounts liberalisations that were reversed are the re-imposed regulatory restrictions on external capital accounts transactions in Malaysia in 1998 and Argentina in 2001. As such knowledge about the true extent of any liberalisation can only be gained over time. The inference from the analysis is that international capital inflows increase over time with a country-wide liberalisation that is uncertain, but instantaneously with a liberalisation that is certain and irreversible. Furstenberg (1998) also argues that overtime international capital flows increase in response to a well-thought-out process of liberalisation that requires a series of well-structured elements of institutionalisation.

Empirical studies, including those by Delechat et al. (2009), Asiedu and Lien (2004) and the International Monetary Fund's 2008 study, however, do not provide any conclusive evidence in support of the hypothesis that financial liberalisation spurs cross-border capital flows. Studies by

Vo (2005b) and Lane and Milessi-Feretti (2003) also indicate that both the timing and knowledge of financial liberalisation can lead to different responses in foreign investment inflows. The time response of international capital flows to external financial liberalisation is yet to be identified. Hence, our contribution to research is to investigate the short- and long-run effects of external financial liberalisation on international capital flows, with focus on equity flows, in selected sub-Saharan African countries.

There are several other factors mentioned in the literature as important determinants of international equity flows. Some of the mentioned potential determinants of international equity flows are domestic financial depth, growth in the level of economic development and global conditions including movements in international interest rates and economic growth in advanced countries (Calvo et al., 1993; Fernandez-Arias and Montiel, 1996; Mukesh, 2006). These are discussed, in turn, in the next sub-section.

3.3.2 Other potential determinants of international equity flows

One of the important potential determinants of international equity flows mentioned in the literature is the depth of the domestic financial sector. A well-developed domestic financial market offers investors increased opportunities for assets diversification (Vo, 2005a). Additionally, an efficient domestic financial market, combined with extensive financial infrastructure, improves credit available to meet the short- and long-term needs of investors as well as enhances access to information (Edison et al., 2002, Lane and Milesi-Ferretti, 2003). The relationship between international equity flows and domestic financial development also depends on the type of foreign equity. An inefficient and less developed financial system can be overlooked by international equity investors if foreign equity is in the form of foreign direct investments. Many of the empirical studies, including those by Ahmed et al. (2005), Vo (2005) and Delechat et al. (2009) are in support of the hypothesis that higher levels of domestic financial development lead to greater inflows of foreign investment.

Another important potential determinant of international equity flows mentioned in the literature is growth in the level of economic development. According to Ahmed et al. (2005) a fast growing economy implies higher future earnings and reduced risks. Also, a stable

macroeconomic environment, in the of low and less volatile inflation rates, reduces uncertainty for foreign investors (Rogoff and Reinhart, 2003). Empirical studies, including Ahmed et al. (2005) and Dasgupta and Ratha (2000), identified improved macroeconomic performance, in the form of reduced inflation rates and volatility, as well as increased GDP growth, to be positively correlated with foreign investments.

The key global factors identified in the literature are international interest rate movements, the growth rate of the world GDP and global financial stability or crises (Calvo et al., 1993). Decisions by foreign investors, in part, depend on the opportunity costs of foreign investments to foreign investors. A rise in international interest rates or an increase in GDP growth of advanced countries increases the opportunity costs of foreign investments. The resultant rise in opportunity costs makes foreign investment less attractive. Global financial instability or crises also leads to the contraction of global credit and heightened risks for international finance, which in turn, reduces foreign capital flows (Reinhart and Rogoff, 2009). Empirical studies, those by including Ahmed et al. (2005) and Chuhan et al. (1998), identified international interest rate movements as an important determinant of international capital flows.

3.4 Methodology

3.4.1 Hypothesis

From the earlier survey and review of existing theories and empirical literature on the determinants of international equity flows, our working hypothesis is as follows: Financial liberalisation has both short- and long-run effects on international equity flows.

3.4.2 Empirical model

The analysis involved use of a time series econometric model to distinguish between short- and long-run impacts of external financial liberalisation on international equity flows in the two greatest recipients of foreign equity flows in the sub-region; namely, South Africa and Nigeria (see footnote 5). We investigate the role of external financial liberalisation in accounting for the relative success story of these two countries in attracting international equity flows in the short and long run.

The estimation model used for the time-series regression analysis of the dynamics of international equity flows and external financial liberalisation in these two countries is a modified version of the works by Wesso (2001) and Abdullah et al. (2006).

In this study, the long-run model for international equity flows to South Africa and Nigeria respectively is as follows:

$$FEIQ_t = f(EFL_t, DC_t, \varepsilon_t) \quad (3.1a)$$

$$FEIQ = f(EFL_t, QPCG_t, u_t) \quad (3.1b)$$

where *FEIQ, EFL, DC, QPCG* are respectively, the international equity flow as a percentage of nominal gross domestic product (GDP), external financial liberalisation, domestic financial development (measured as the share of domestic credit to private sector in GDP) and growth in GDP per capita. The notations ε and u respectively represent vectors of reduced form residuals. The subscript t denotes time period.

We first investigated the time series properties of the variables by employing the augmented Dickey-Fuller (ADF) unit root test. This was followed by an examination of the long-run relationship between equity flows and the potential explanatory variables using the Johansen's Co-integration procedure. A restricted vector autoregressive (VAR) model, or the vector error correction model (VECM), was used to verify the short-run dynamics between foreign equity flows and other appropriate variables, including external financial liberalisation as well as the dynamic inter-linkages among the endogenous variables (see Table A3.1 Appendix A3.13.1 for notes on justification). This model allows for an inference of the dynamic response of equity flows to other determinants overtime. The estimated restricted VAR for international equity flows over nominal GDP (*FEIQ*) includes the earlier mentioned explanatory variables of equation 3.1a and 3.1b. A formal presentation of the system in a reduced-form format is as follows:

$$\Delta X_t = \Pi X_{t-1} + \beta(L)\Delta X_{t-1} + v_t \quad (3.2)$$

where ΠX_{t-1} is the error correction term from the cointegrating equation 3.1, X is the set of endogenous variables, Δ is first differencing and $\beta(L)$ is a lag operator of the order L. The coefficient matrix Π includes information about the long-run relationships among the variables involved in the model. International interest rate (measured as the United States' 10-year Treasury bond yield rate) and a dummy for the 2008-2009 global financial crisis period are also included in the VECM as exogenous variables, to capture the effect of global conditions, including the 2008-2009 global financial crisis period.

The restricted VAR also help with the computation of the impulse response of the endogenous variables to shocks in the system and a decomposed analysis of changes in the endogenous variables.

3.5 Data and variable definitions

3.5.1 Data source

For Nigeria and South Africa, data on foreign equity flows, share of credit to private sector in GDP and growth in real GDP per capita were obtained from the World Bank's World Development Indicators 2010. The United States' 3-year bond and 3-months Treasury bill rates as well as GDP growth in advanced countries were obtained from the IMF's *Global Economic Outlook* (various issues). The construction of the index for external financial liberalisation involved sourcing qualitative data from the IMF's Annual Reports on Exchange Arrangements and Exchange Restrictions. The chronology used by Kaminsky and Schmukler (2003) was adopted for the construction of the liberalisation index. Additionally, this index was modified to include regulatory restrictions on FDI. The study period is from 1971 to 2009 for South Africa and from 1971 to 2008 for Nigeria. The year 2009 is excluded from the regression analysis for Nigeria because the large banking crisis that occurred in the country led to significant capital outflows, and hence including the observation for that year could lead to inconsistent estimates.

3.5.2 Variable definition and measurement

International equity flow is calculated as the sum of foreign direct investment and portfolio equity inflows, expressed as a percentage share of GDP. This indicator is a quantity-based

measure of international equity integration. In view of the focus of the study, the key explanatory variable in the model is external financial liberalisation. Based on Kaminsky and Schmukler (2003), our measure of external financial liberalisation indicator is an average of indices for regulatory restrictions on external capital account transactions, namely regulatory restrictions on FDI inflows, overseas borrowing, foreigners' purchase of domestic equity and reforms leading to elimination of multiple exchange rate practices.[9] The value '1' is assigned when there is high regulatory restriction, '2' is assigned for partial restriction or liberalization and '3' is assigned for complete liberalization. Lane and Milessi-Feretti (2003) and Vo (2005b) suggest that external financial liberalisation leads to increases in international equity flows in both the short- and long-term. The value '1' is assigned when there is high regulatory restriction, '2' is assigned for partial restriction or liberalisation and '3' is assigned for complete liberalisation. From the surveyed literature, our working hypothesis is that external financial liberalization lead to increases in international equity flows in both the short- and long-term.

Measures and definition of the control variables in the model are also provided in turn. First, due to data limitations, the domestic credit to GDP ratio is used as a proxy for domestic financial depth and subsequently the development of the domestic financial market. Edison and Reinhart (2001) and Vo (2005a) suggest that higher levels of financial development promote greater inflows of foreign capital. Second, economic growth is measured by the one-period lagged percentage growth in GDP per capita. This is used as a proxy for growth prospects. Prasad et al. (2003) propose that improved macroeconomic performance increases equity flows. Third, the United States' long-term interest rate (which is the 10-year Treasury bond yield at constant maturity) and short-term interest rate (3-month Treasury bill rate) were used as proxies for world interest rate (Ahmed et al., 2005). Studies, including the study by Fernandez-Arias et al. (1996), suggest that higher levels of international interest rates reduce international returns on investments and make foreign investments less attractive. Fourth, the "agglomeration" effect is captured by introducing one-period lagged value of international equity flow, expressed as a ratio of GDP. Recent research indicates that capital flows tend to crowd together in particular

[9]External financial liberalisation and capital account liberalisation are used interchangeably to refer to the relaxation of regulatory restrictions on a country's capital account transactions. Also, see sub-sections 2.3.1 and 2.5.2 of Chapter two for details on how the liberalisation index is constructed.

locations referred to as the "agglomeration" effect (Kamaly, 2002). The theory behind this is that capital flows and subsequently the current level of international financial integration depend on a country's past success in attracting flows and getting integrated with international financial markets. Consequently, the expected sign of the coefficient is positive.

3.6 Estimation Results

An investigation of the time series properties of the data for both South Africa and Nigeria indicated that all the series were integrated of order 1, indicating stationarity after first differencing. Results of the augmented Dickey-Fuller and Philips-Perron tests of the series are reported in Table A3.1 in Appendix A3.1. The cointegration test results for the variables considered in the VAR model indicated the existence of one cointegrating vector for both countries. The cointegration test results are reported in Tables 3.3 and 3.4.

Table 3.3: Cointegration test results (South Africa)

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace statistic	0.05 critical value	Prob. **
None *	0.462	33.841	29.797	0.016
At most 1	0.223	10.319	15.495	0.257
At most 2	0.019	0.745	3.842	0.388
Unrestricted Cointegration Rank Test (Maximum eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen statistic	0.05 critical value	Prob. **
None *	0.462	23.522	21.132	0.023
At most 1	0.223	9.574	14.265	0.241
At most 2	0.019	0.745	3.842	0.388

*Notes: Trace test indicate 1 cointegrating equation(s) at the 0.05 level. Max-eigenvalue indicates 1 cointegrating equation(s) at the 0.05 level. **Mackinnon-Haug-Michelis (1999) p-values*

Series: Foreign equity flow ratio, external financial liberalisation index, domestic credit to private sector ratio, U.S. interest rate (long-term) and the 2008-2009 global financial crisis dummy.

Table 3.4: Cointegration test results (Data on Nigeria)

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace statistic	0.05 critical value	Prob. **
None *	0.573	46.108	29.797	0.012
At most 1	0.280	13.972	15.495	0.090
At most 2	0.015	0.302	3.842	0.676
Unrestricted Cointegration Rank Test (Maximum eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen statistic	0.05 critical value	Prob. **
None *	0.573	33.108	29.797	0.012
At most 1	0.280	10.981	15.495	0.067
At most 2	0.015	0.302	3.842	0.666

*Notes: Trace test indicate 1 cointegrating equation(s) at the 0.05 level. Max-eigenvalue indicates 1 cointegrating equation(s) at the 0.05 level. **Mackinnon-Haug-Michelis (1999) p-values*

Series: Foreign equity flow ratio, external financial liberalisation index, GDP per capita growth, U.S. interest rate (long-term) and the 2008 global financial crisis dummy.

The results from estimating the static long-run equations (standard errors in parentheses) for foreign equity flow ratio in South Africa and Nigeria are presented as equations 3.3 and 3.4 respectively:

$$FEIQ_t = 3.109*EFL_t + 5.131*DC_t \quad (3.3)$$
$$(0.668) \quad (1.018)$$

$$FEIQ_t = 1.731*EFL_t + 0.573*QPCG_t \quad (3.4)$$
$$(1.042) \quad (0.109)$$

The results from estimating the static long-run equations indicate that external financial liberalisation increases international equity flows in both South Africa and Nigeria in the long run and highlight the importance of deregulating cross-border capital flows, which was ignored in the studies by Wesso (2001) and Abdullah et al. (2006). Domestic financial development also contributes positively to the attraction of foreign equity flows in South Africa in the long-run. In case of Nigeria, growth in GDP per capita positively contributes to international equity flows.

Estimation results for the cointegrating equations and vector error correction models for both countries are presented in Tables 3.5 and 3.6 below. The estimated VEC specifications for South Africa and Nigeria suggest that the speed of adjustment of international equity flows towards its

long-run equilibrium is 22 per cent and 18 per cent for South Africa and Nigeria respectively. The results compare favourably with those of Wesso (2001) and Abdullah et al. (2006). Overall, an increase in U.S. (long run) interest rate is found to have a negative short-run effect on international capital flows in South Africa. The results indicate that an increase in international interest rate discourages foreign investments and highlights the importance of global developments in explaining the short-run dynamics of international capital flows in South Africa. In addition, increased financial depth has a short-run positive impact on foreign equity inflow, but is negatively correlated with the liberalisation policy. The results suggest that although a deepening of the domestic financial sector encourages greater inflows of foreign equity in the short-run, the policy response to an increase in the rate of financial development is a slow-down in the pace of external financial liberalisation in South Africa. The results also indicate that foreign equity flows to South Africa decreased during the 2008-2009 global financial crisis period. The estimation results also reflect the downside risk of large portfolio equity outflows that occurred because of the external shock.

Table 3.5: Cointegration Equation and ECM (South Africa)

Cointegration equation			
Sample (adjusted): 1972-2009 T-statistics in [ ]			
Variables		**Coefficients**	
Foreign equity flow ratio (-1)		1.000	
External financial liberalisation index (-1)		-3.109 [-4.657]	
Domestic credit to private sector ratio (-1)		-5.131 [-5.039]	
Constant		-18.985	
Vector Error Correction Estimates for South Africa			
Dependent variables	Δ foreign equity flow ratio	Δ external financial liberalisation	Δ domestic credit to private sector ratio
Error correct term (-1)	-0.224 [-2.304]	-0.034 [-4.071]	-2.718 [-1.882]
Δ foreign equity flow ratio (-1)	0.035 [0.199]	0.001 [0.411]	0.287 [0.576]
Δ external financial liberalisation index (-1)	0.333 [0.043]	0.042 [0.285]	-6.445 [-0.302]
Δ domestic credit to private sector ratio (-1)	0.042 [1.683]	-0.014 [-2.690]	-0.148 [-0.669]
Constant	7.195 [1.755]	0.036 [0.450]	11.087 [0.967]
2008-2009 global financial crisis period dummy	-4.190 [-2.961]	-0.216 [-1.359]	-1.110 [-0.486]
U.S interest rate (long term)	-0.835 [-1.685]	0.001 [0.106]	-1.146 [-0.797]
Adj. R-squared	0.156	0.191	0.150
F-statistic	1.980	2.250	1.936

Note: The notation Δ denotes change; (-1) denotes a one-period lag value.

Table 3.6: Cointegration Equation and ECM (Nigeria)

Sample (adjusted): 1972 2009 T-statistics in [ ]			
Variables		**Coefficients**	
Foreign equity flow ratio (-1)		1.000	
External financial liberalisation index (-1)		-1.731 [-1.662]	
GDP per capita growth (-1)		-0.573[-5.263]	
Constant		-1.200	
Vector Error Correction Estimates for Nigeria			
	Δ foreign equity flow ratio	Δ external financial liberalisation	Δ GDP per capita growth
Error correct term (-1)	-0.176 [-1.674]	-0.038 [-2.369]	-1.585 [-4.333]
Δ foreign equity flow ratio (-1)	-0.269 [-1.549]	-0.037 [-1.827]	-0.448 [-0.872]
Δ external financial liberalisation index (-1)	1.981 [1.849]	0.107 [0.574]	0.187 [-0.058]
Δ GDP per capita growth (-1)	-0.037 [-0.749]	-0.021 [-1.691]	-0.024 [-0.164]
Constant	0.057 [1.81]	0.055 [1.48]	-0.109 [-0.12]
U.S interest rate (long-term)	-0.169 [-1.781]	0.008 [1.009]	-0.263 [-0.769]
Year 2008 dummy	-3.157 [-1.65]	-0.148 [-0.653]	-0.834 [-0.145]
Adj. R-squared	0.227	0.434	0.423
F-statistic	2.766	5.595	5.380

Note: The notation Δ *denotes change;* (-1) *denotes a one-period lag value.*

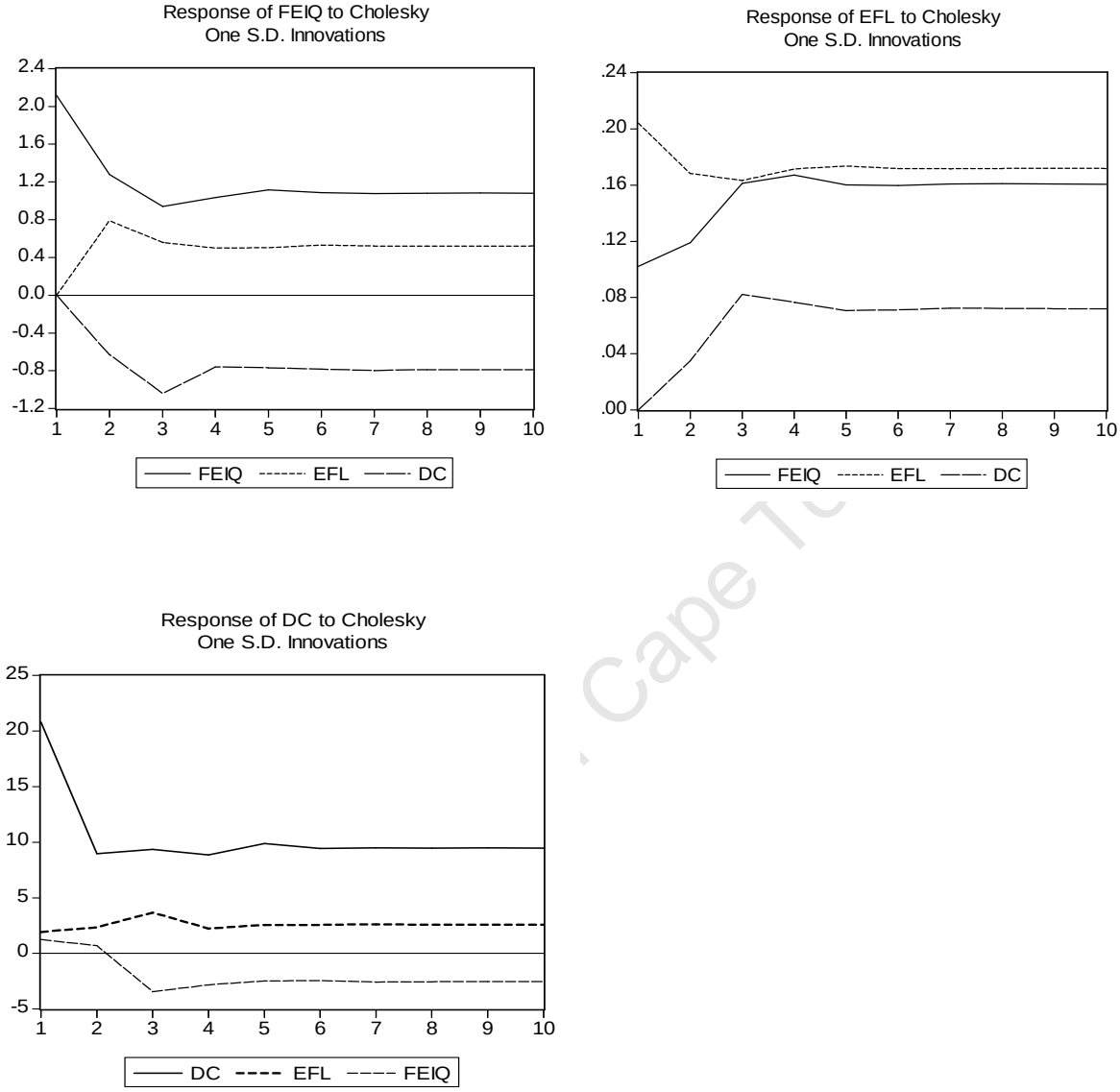
The results indicate a strong negative effect of increased inflows of foreign equity on the rate of liberalisation. This suggests that the policy response to increased inflows of international equity is a decrease in the rate of liberalisation. The effect of the liberalisation policy on the inflow of foreign equity is positive and significant. The results suggest that an increase in the rate of liberalisation leads to an increase in the rate of inflow of international equity to Nigeria. The results also indicate a strong negative impact of growth in GDP per capita on the decision to liberalise the flow of international capital to Nigeria. This implies that poor growth performance in Nigeria compels government to reduce regulatory restrictions on international capital inflows and encourage the attraction of greater inflows of foreign investments. In addition, an increase in international interest rate reduces equity flows to Nigeria in the short run. The results also

indicate that the 2008 global financial crisis period dummy is negatively correlated with foreign equity inflows. This suggests that foreign equity flows to Nigeria declined in the year 2008, one of the years in which the impact of the global financial crisis was felt in Africa. The estimation results do not provide evidence of a strong agglomeration effect in the short run for both countries.

3.6.1 Impulse Response

The sub-section focuses on examining the response of international equity flows and regulatory policy to their own shocks and to other exogenous shocks in the real and financial sectors of the South African and Nigerian economies. For purposes of identification, the following assumptions are made: First, international interest rates and economic growth in advanced countries are determined exogenously; secondly, international interest rates and GDP growth in advanced countries have an influence on all of the other variables; and lastly, there is a dynamic inter-relationship among the other variables. The response of international equity inflows and regulatory policy to the unanticipated shocks is ascertained from the impulse response functions of the VAR model. The estimation results of the impulse responses to shocks are presented in Figures 3.1 and 3.2. Figure 3.1 indicates that international equity flow responds positively to its own shock and to policy shock, but responds negatively to shocks that hit the domestic financial sector in South African economy. The response of regulatory policy to its own shock and to shocks that affect the volume of foreign equity flows and the domestic financial sector is positive in the South African economy. In addition, the domestic financial sector responds positively to its own shock and to unanticipated policy shocks in the South African economy. External financial shocks impact positively on the domestic financial sector of South Africa in the initial stages, but the impact turns negative in the subsequent years.

Figure 3.1: Selected impulse response function for South Africa

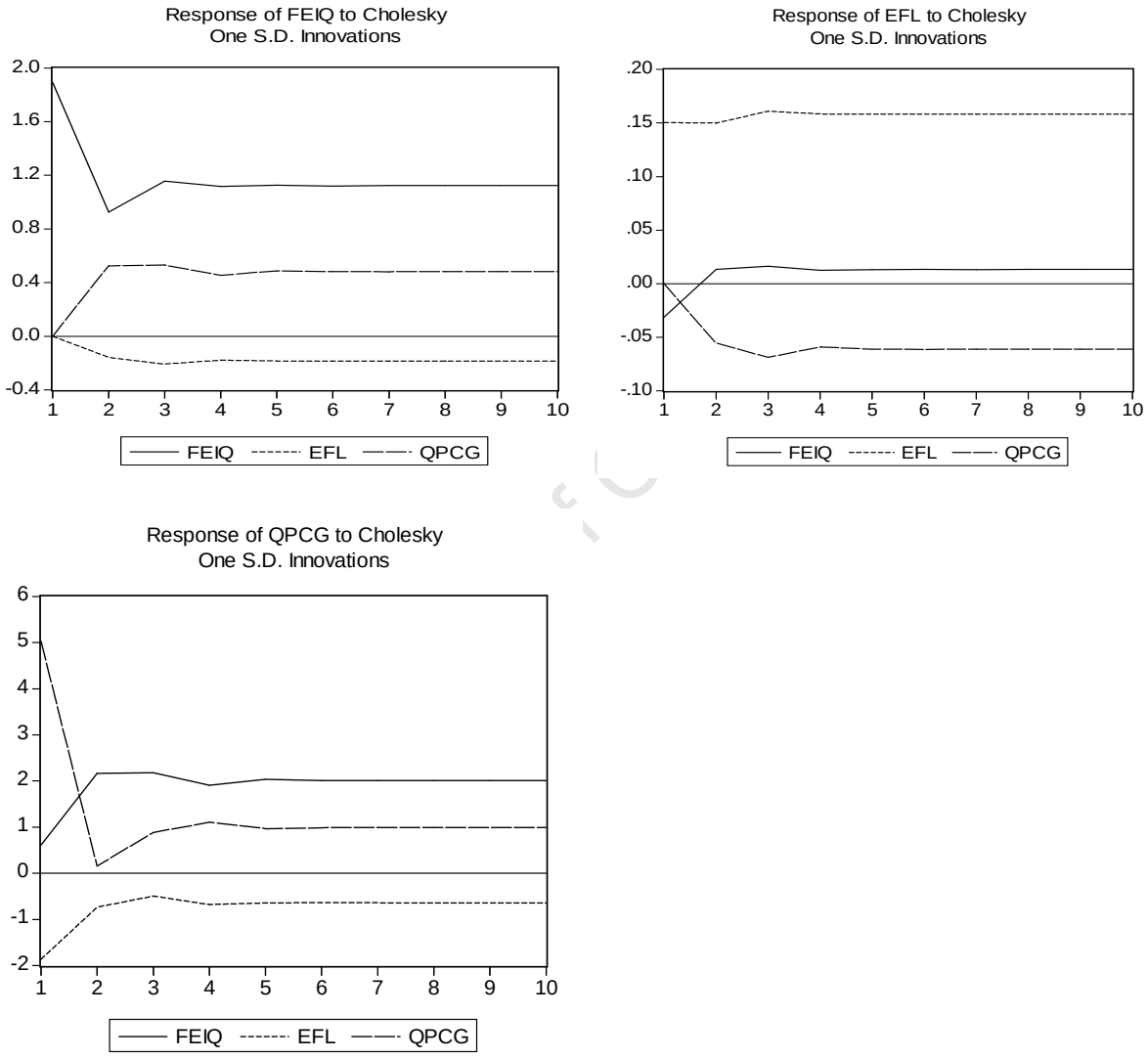


Note: The notations: FEIQ denotes the ratio of foreign equity flow to GDP ; EFL denotes external financial liberalisation index; DC denotes domestic credit to private sector as share of GDP.

Figure 3.2 indicates that international equity inflow responds positively to its own shocks and to domestic output shocks and this effect quickly dies out but responds negatively to policy shocks in the Nigerian economy. The graph also indicates that negative shocks to domestic output prompt a policy response in the form of a more liberalized external financial sector. The response of policy to its own shock is also positive. In addition, the response of policy to external financial

shock is negative at the onset, but the response turns positive in the subsequent years. Lastly, an unanticipated surge in international equity inflow and shocks to domestic output impact positively on economic growth in Nigeria, whilst unanticipated changes to regulatory policy impact negatively on economic growth in Nigeria.

Figure 3.2: Selected impulse response function for Nigeria



Note: The notations: FEIQ denotes the ratio of foreign equity flow to GDP; EFL denotes external financial liberalisation index; QPCG denotes growth in GDP per capita.

3.6.2 Variance Decomposition Analysis

The variance decomposition analysis shows the relative importance of each variable targeted. A one-period lag restricted VAR model was used to decompose the innovations of the endogenous variables into components that explain variations that can be attributed to 'own' innovations and to innovations in the other endogenous and exogenous variables. Variance decomposition for South Africa and Nigeria is presented in Tables 3.7 and 3.8.

The most dominant source of variation in international equity flows in South Africa is 'own shocks'. The improvement in domestic credit is the next key source of variation in international equity flows. This implies that the most effective instrument for international equity flows in South Africa is the deepening of the domestic financial market. It is also observed that unanticipated changes in international equity flows and policy shocks are the two most important sources of variations in the external financial liberalisation policy in South Africa. This suggests that changes to regulatory restrictions on cross-border capital flows largely depend on the actual volume of foreign equity flows in South Africa**.** The main sources of variations in domestic credit are its "own" shocks, innovations in external financial liberalisation and global liquidity shocks. The results suggest that increased openness to cross-border capital movement is an effective instrument for the development of the domestic financial sector of the South African economy. The results also suggest that the domestic financial sector of South Africa is highly susceptible to business cycle developments in the advanced economies.

Table 3.7: Variance decomposition analysis (South Africa)

Percentage variations in foreign equity flow (*FEIQ*)			
Period	*FEIQ*	*EFL*	*DC*
1	100.00	0.00	0.00
8	86.45	8.06	5.50
12	74.60	9.30	16.10
16	71.24	9.82	18.94
20	69.28	10.07	20.66
24	67.51	10.43	22.06
28	66.05	10.66	23.29
32	64.96	10.84	24.19
36	64.09	10.99	24.92
40	63.36	11.11	25.53
Percentage variations in external financial liberalisation (*EFL*)			
Period	*FEIQ*	*EFL*	*DC*
1	20.62	79.38	0.00
8	26.56	72.17	1.27
12	33.38	61.60	5.02
16	36.72	57.15	6.13
20	38.07	55.42	6.51
24	38.96	54.26	6.78
28	39.63	53.36	7.01
32	40.12	52.71	7.17
36	40.49	52.22	7.29
40	40.79	51.83	7.39
Percentage variations in domestic financial depth (*DC*)			
Period	*FEIQ*	*EFL*	*DC*
1	0.31	0.79	98.90
8	0.32	1.73	97.94
12	2.14	3.38	94.47
16	3.01	3.63	93.36
20	3.38	3.89	92.74
24	3.66	4.12	92.22
28	3.95	4.33	91.72
32	4.17	4.48	91.34
36	4.36	4.61	91.03
40	4.51	4.73	90.76
Cholesky Ordering: *FEIQ EFL DC*			

Note: The notations: FEIQ denotes foreign equity flow to GDP ratio; EFL denotes external financial liberalisation index; DC denotes domestic credit to private sector as share of GDP

Table 3.8: Variance decomposition analysis for Nigeria

Percentage variations in foreign equity flow (*FEIQ*)			
Period	*FEIQ*	*EFL*	*QPCG*
1	100.00	0.00	0.00
8	93.89	3.56	2.55
12	93.37	2.91	3.72
16	92.42	3.30	4.28
20	92.36	2.84	4.80
24	92.20	2.72	5.08
28	92.15	2.50	5.35
32	92.10	2.37	5.53
36	92.06	2.25	5.69
40	92.03	2.16	5.82
Percentage variations in external financial liberalisation (*EFL*)			
Period	*FEIQ*	*EFL*	*QPCG*
1	1.28	98.72	0.00
8	2.72	93.86	3.42
12	3.57	92.70	3.74
16	3.27	91.92	4.81
20	3.05	91.82	5.12
24	2.68	91.75	5.58
28	2.44	91.72	5.84
32	2.21	91.72	6.08
36	2.04	91.70	6.26
40	1.89	91.70	6.41
Percentage variations in rate of growth of GDP per capita (*QPCG*)			
Period	*FEIQ*	*EFL*	*QPCG*
1	0.30	1.20	98.51
8	12.67	1.22	86.12
12	23.37	1.34	75.29
16	29.69	1.23	69.09
20	36.04	1.15	62.82
24	40.61	1.06	58.33
28	44.79	0.98	54.23
32	48.19	0.92	50.89
36	51.19	0.86	47.95
40	53.78	0.82	45.40
Cholesky Ordering: *FEIQ EFL QPCG*			

Note: The notations: FEIQ denotes foreign equity flow to GDP ratio; EFL denotes external financial liberalisation index; QPCG denotes growth in GDP per capita

In Nigeria, the main sources of variations in international equity flows are its "own" shocks and improvement in the rate of growth of the domestic economy. This implies that stimulating higher

economic growth is the most important instrument for international equity flows in Nigeria. Variations in external financial liberalisation are mainly due to its own shocks and to innovations in economic growth. This suggests that authorities change the liberalisation policy in response to changes in the rate of growth of the domestic economy. The results also reflect the fact that there have been instances of policy reversals in Nigeria. Variations in economic growth in Nigeria are also largely due to innovations in its "own" shocks, and to a surge in international equity flows.

Interpretation of the impulse response functions ought to be done with caution, because even though the ordering of variables is expected in VAR, it is done arbitrarily, which limits the meaning attached to estimated impulse response functions and variance decomposition analysis.

3.7 Conclusions, Suggestions and Recommendations

The main objective of this study was to investigate the long- and short-term impact of external financial liberalisation on international equity flows in South Africa and Nigeria. The achievement of this objective involved time series econometric analysis.

Our findings confirm the hypothesis that external financial liberalisation has a long-run effect on international equity flows. Liberalising the external financial sector is an important pre-requisite for the attraction of greater inflows of foreign equity in South Africa and Nigeria. The results are similar to those of Boamah et al. (2007) for Jamaica and Trinidad and Tobago. The study also confirms the hypothesis that external financial liberalisation has a short run impact on foreign equity flows in Nigeria. Increased depth of domestic financial markets impacts positively on international equity flows in South Africa in the long- and short-run, whilst growth performance impacts positively on international equity flows in Nigeria only in the long-run. Furthermore, global conditions play an important role in determining the volume of inflows of international equity to South Africa and Nigeria. An increase in international interest rates discourages foreign investments in South Africa and Nigeria in the short-run. The results are similar to those of the study by Wesso (2001). There is also evidence that international equity flows to South Africa and Nigeria have declined significantly during the 2008-2009 global financial crisis.

The results from the estimated impulse response function indicate that international equity flows respond negatively to unanticipated shocks from the domestic financial markets, and positively to its own shock and to unanticipated policy shocks in South Africa. In Nigeria, international equity flow responds positively to its own shocks and unanticipated shocks to domestic output growth. However, financial policy shocks impact negatively on output growth in the Nigerian economy. The results are consistent with the findings of Wesso (2001). Lastly, effective instruments for international equity flows in South Africa and Nigeria, respectively, are domestic credit expansion (in the case of South Africa) and policies for stimulating higher economic growth (in the case of Nigeria).

Tentative recommendations can be made from the research findings. First, Nigeria (NIG) can attract greater inflow of international equity in the long term by further reducing regulatory restrictions on its capital account transactions and pursuing policies for the achievement of higher growth rates. One option for achieving higher economic growth rates is to create incentives for increased activities in sectors with comparatively higher growth potentials. Further capital account liberalisation can also attract international equity to Nigeria in the short run. Second, the development of the domestic financial sector is essential for the attraction of greater inflow of foreign equity in South Africa in the short- and long-term. This means that South Africa must maintain a strong financial infrastructure, encourage greater savings mobilisation, and promote greater competition and increased efficiency in service delivery in the financial sector. Further capital account liberalisation can also help to attract greater inflow of international equity to South Africa in the short-term.

The major limitation of the study is the absence of adequate data on portfolio equity flows for Nigeria which constrains the ability to pursue a separate analysis and compare the effect of financial liberalisation on portfolio equity flows in the two countries. The study also offers some direction for future research. In particular, the ineffectiveness of reforms to regulatory restrictions in influencing external capital flows in the short-run could be the result of weak institutions and administrative capacity for monitoring the flows. It could also be the result of inadequate administrative and institutional infrastructure for the enforcement of the regulations (Ostry et al., 2010). Future research should focus on investigating the long- and short-run

impacts of institutions and infrastructure on international capital flows to Sub-Saharan African countries. Also, future investigations of the long- and short-run impacts of the different types of domestic financial liberalisation on international capital flows can be considered.

References

Abdullah, M. A., Mansor, S. A. and Chin-Hong, P. (2006): "Determinants of international capital flows: the case of Malaysia", mimeo, Universiti Malaysia Sarawak.

Ahmed, F., Arevki, R. and Funke N. (2005): "The composition of capital flows: Is South Africa different?", *IMF Working Paper 05/40.* African Department, International Monetary Fund.

Albuquerque, R. (2003): "The composition of international capital flows: Risk-sharing through foreign direct investment", *Journal of International Economics* 61(December), 353-383.

Asiedu, E., and Lien, D. (2004): "Capital controls and foreign direct investment", *World Development* 32(March), 479-490.

Bacchetta, P. and van Wincoop, E. (2000): "Trade in nominal assets and net international capital flows", *Journal of International Money and Finance*, 19(1), 55-72.

Boamah, D., Craigwell, R., Downes, D., Greenridge, K. and Mitchell, T. (2007): "The impact of capital account liberalisation in the Caribbean", in R. Craigwell, K. Greenridge and M. Williams (eds.), *Aspects of financial liberalisation and capital market development in the Caribbean*, 133-153. Barbados: Central Bank of Barbados.

Calvo, G., Leiderman, L. and Reinhart, C. (1993): "Capital inflows and real exchange rate appreciation in Latin America: The role of external factors", *IMF Staff Papers* 40(March), 108-151.

Chuhan, P., Claessens, S. and Mamingi, N. (1998): "Equity and bond flows to Latin America and Asia: The role of global and country Factors", Journal of Development Economics 55(April), 439-463.

Dasgupta, D. and Ratha, D. (2000): "What factors appear to drive private capital flows to developing countries? And how does official lending respond?", World Bank Working Paper No. 2392.

Delechat, C., Ramirez, G., Wagh, S. and Wakeman-Linn, J. (2009): "Sub-Saharan Africa's integration in the global financial markets", *IMF Working paper* 09/114, May: International Monetary Fund.

Edison, H.J., Levine, R., Antonio, L. R. and Torston, S. (2002): "International Financial integration and economic growth", *Journal of International Money and Finance* 21(6), 749-776.

Edison, H. J. and Reinhart, C. M. (2001): "Capital controls during financial crises: The cases of Malaysia and Thailand", in *Financial Crises in Emerging Markets*, Chapter 12, by R. Glick, R. Moreno, and M. M. Spiegel (eds.). Cambridge, UK: Cambridge University Press.

Edison, H. J. and Warnock, F. E. (2006): "Cross-border listings, capital controls, and equity flows to emerging markets", NBER Working Paper 12589 (Cambridge, Massachusetts: National Bureau of Economic Research), October.

Fernandez-Arias, E. and Montiel, P. J. (1996): "The surge in capital inflows to developing countries: an analytical overview" *World Bank Economic Review* 10(1) 51-77.

Furstenberg, V. G. M. (1998): "From worldwide capital mobility to international financial integration: A review essay", *Open Economies Review* 9, 53-89.

Gordon, R. and Bovenberg, A. L. (1996): "Why Is capital so immobile internationally?: Possible explanations and implications for capital income taxation", *American Economic Review* 86(December), 1057-1075.

International Monetary Fund, Regional Economic Outlook: Sub Saharan Africa *in World Economic and Financial Surveys*, April 2008.

International Monetary Fund, Regional Economic Outlook: Sub Saharan Africa *in World Economic and Financial Surveys*, April 2009.

International Monetary Fund, Balance of Payments Statistics (various issues).

Kamaly, A. (2002): "Behind the surge in FDI to developing countries in the 1990s: An empirical investigation", unpublished. College Park, Maryland: University of Maryland.

Kaminsky, G. and Schmukler, S. (2003): "Short-run pain, Long-run gain: The effects of financial liberalization", *IMF Working Paper* No. 03/34, Washington, DC

Johansen, Søren (1991): "Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models," *Econometrica*, 59, 1551–1580.

Lane, P. R. and Milesi-Ferretti, G. M. (2000): "External capital structure: Theory and evidence", IMF Working Paper 00/152 (Washington: International Monetary Fund).

Lane, P. R., and Milesi-Ferretti, G. M. (2003): "International financial integration", *Institute for International Integration Studies Discussion Paper* No.03. Dublin: Institute of International Studies, July.

———, (2001): "Financial Supermarkets: Size Matters for Asset Trade", NBER Working Paper No. 8476 (Cambridge, Massachusetts: National Bureau of Economic Research), September.

MacKinnon, J. G., Haug, A. A. and Michelis, L. (1999): "Numerical distribution functions of likelihood ratio tests for cointegration", *Journal of Applied Econometrics* 14, 563-577.

Mukesh R. (2006): "Determinants of capital flows: A cross-country analysis", Econometrics Working Papers 0601, Department of Economics, University of Victoria. British Columbia, Canada.

Obstfeld, M. (1994): "Risk taking, global diversification, and growth", *American Economic Review* 84, 1310-1329.

Ostry, J. D., Ghosh, A. R., Habermeier, K., Chamon, M., Qureshi, M. S. and Reinhardt, D. B. S. (2010): "Capital inflows: The role of controls", *IMF Staff Position Note* No. 2010/04

Prasad, E., Rogoff, K., Shang-Jin, W. and Kose, M. A. (2003): "Effects of financial globalization

on developing countries: Some empirical evidence", IMF.

Reinhart, C. and Rogoff, K. (2009): "This time it's different: eight centuries of financial folly", MPRA Paper No. 17452, September 2009 http://mpra.ub.uni-muenchen.de/17452/

Rogoff, K. and Reinhart, C. (2003): "FDI to Africa: The role of price stability and currency instability", IMF Working Paper 03/10 (Washington: International Monetary Fund).

Tswamuno, D. T., Pardee, S. and Wunnava, P. V. (2007): "Financial liberalisation and economic growth: Lessons from the South African experience", *International Journal of Applied Economics* 4(2), 75-89. September 2007.

Vo, X. V. (2005a): "International financial integration and economic growth - a Panel analysis", *Working Paper Series*, School of Economics and Finance - University of Western Sydney.

Vo, X. V. (2005b): *Determinants of International Financial Integration*, School of Economics – University of New South Wales

Wesso, G. R. (2001): "The dynamics of capital flows in South Africa: an empirical investigation", *Quarterly Bulletin* 220 (June 2001), 59-78. South African Reserve Bank

World Bank, World Development Indicators, various issues

Appendix A3

A3.1 Analytical framework

Three estimation techniques can be used to analyse the dynamic inter-linkages among foreign equity flows, external financial liberalisation, domestic financial depth and economic growth. These are single equation estimations, simultaneous equation estimations and the vector error correction (VECM) and/or vector auto-regressions (VAR). However, the use of the single equation estimation approach would normally lead to biased estimates for the parameters, if there is bidirectional causality among the variables of interest. Also, the use of the simultaneous equation estimation approach makes it impossible to capture the impact of unanticipated shocks

on the endogenous variables and to identify the relative importance of each variable in explaining the dynamics of endogenous variables. Our goal is to examine the impact of unanticipated domestic and global financial shocks on international equity inflows, external financial policy, domestic financial depth and domestic output growth, and at the same time identify the most effective instruments for each targeted variable. As a result of that, the most convenient option is to use the VAR and VEC models. The VECM is recommended for non-stationary series that are cointegrated since the VECM encompasses all other models.

In this study, the restricted VAR or VECM model is used after testing for stationarity and cointegration among the relevant variables. The problem of identification is also solved by making some identifying assumptions or restrictions. Hence, the VAR model is specified as follows:

$B(L)X_t = U_t$, where t = 1, 2, ..., n (A3.1)

The notation L denotes lagged values. The notation U represents innovations for X, which are assumed to be normally distributed. The B matrix can now be inverted and each of the endogenous variables can be expressed in terms of its own innovations and the lagged values of the innovations of all the other series. This can be shown as follows:

$X_t = [B(L)]^{-1}U_t$ (A3.2)

Our interest is to analyse the dynamics of the model. As such,

$X_t = C(L)V_t$ (A3.3)

where V_t constitutes the innovations of the VAR model and the matrix $C(L)$ comprises the coefficients representing the impulse response of the endogenous variables to shocks in their innovations. The notation X_t denotes a vector of the series: $FEIQ$, EFL and DC for South Africa; and $FEIQ$, EFL and $QPCG$ for Nigeria. The notation $FEIQ$ is foreign equity flows expressed as share of GDP, EFL is external financial liberalisation, DC is domestic credit to private sector expressed as share of GDP, and $QPCG$ is growth in GDP per capita. The matrix of coefficients $C(L)$ can be written as

$$C(L) = \begin{matrix} C_{11}(L) & C_{12}(L) & C_{13}(L) \\ C_{21}(L) & C_{22}(L) & C_{23}(L) \\ C_{31}(L) & C_{32}(L) & C_{33}(L) \end{matrix} \quad \text{(A.3.4)}$$

The changes in $feiq$, efl and dc to a unit shock in the innovations of domestic credit are represented by $C_{13}(L)$, $C_{23}(L)$ and $C_{33}(L)$. In a similar fashion, we can use the other impulse functions to determine the effect of the shocks in the other innovations on endogenous variables.

Equation A3.1 can be expanded and presented as follows:

$X_t = a + b_1X_{t-1} + \ldots\ldots + b_kX_{t-k} + V_t,$ where *t* = 1, 2, ...*n*, (A3.5)

The notation X_t denotes integrated series of order one *I(1)* and *k* stands for the lag length of the series.

From the VAR model (equation A3.5), the variance decomposition analysis of each of the endogenous variables can be undertaken. The variance decomposition defines the share or amount of variation of each of the variables that can be explained by their own respective shocks and exogenous shocks to the other variables.

Based on the recommendations of Johansen (1991), equation A3.5 can be rewritten as an error-correction model as follows:

$\Delta X_t = a + \theta X_t + \varphi_1\Delta X_{t-1} + \ldots\ldots\ldots + \varphi_{k-1}\Delta X_{t-k+1} + V_t,$ *t* = 1, 2, ...*n*, (A3.6)

where: φ_i= -($b_{i+1} + \ldots\ldots + b_k$), *i* = 1, ..., *k-1*, and a = -($I - b_1 - \ldots\ldots\ldots - b_k$).

The φ_i stands for the matrixes of coefficients of the first difference series and thus capture the short-run dynamics. The coefficient of the lagged dependent variable gives information about inertia and the formation of expectation. The coefficients of the other endogenous variables provide estimates for their impact. The coefficient matrix θ provides information about the long-run relationships among the variables in the equation. V is stationary. Hence, the rank of the matrix θ is used to establish how many linear combinations of X_t are stationary.

In theory, movements in international interest rates *ULR* have significant influence on the stability of growth in the domestic output of developing countries that are open to international commodities trade and international investments. Consequently, we include international interest rate in the equations A3.1 to A3.3 as an exogenously determined explanatory variable to enable us capture its effect on the endogenous variables. A dummy for the 2008-2009 global financial crisis period is also included in the VECM model to account for the impact of the crisis period on the inflows of international equity.

For purposes of identification, the following assumptions are made: First, international interest rate and economic growth in advanced countries are determined exogenously; secondly, international interest rate and GDP growth in advanced countries have an influence on all of the other variables; and lastly, there is a dynamic inter-relationship among the other variables.

Table A3.1: Augmented Dickey-Fuller and Philips-Perron tests of unit roots

	South Africa				Nigeria			
Variables	Levels		First difference		Levels		First difference	
Foreign equity flow-to-GDP ratio	-4.03* (I, 0)	-3.85* (I, 0)	-7.02* (I, 0)	-17.40* (I, 0)	-3.49* (I, 0)	-3.49* (I, 0)	-6.08* (I, 0)	-17.33* (I, 0)
External capital accounts liberalisation index	-0.99 (I, 0)	-0.46 (I, 0)	-2.55 (I, 0)	-6.43* (I, 0)	-0.74 (I, 0)	-0.74 (I, 0)	-6.16* (I, 0)	-6.16* (I, 0)
Domestic credit to private sector ratio	-0.92 (I, 0)	-1.75 (I, 0)	-9.41* (I, 0)	-13.34* (I, 0)				
GDP per capita growth					-1.95 (I, 0)	-5.85* (I, 0)	-4.78* (I, 0)	-12.07* (I, 0)
U.S interest rate (long term)					-1.42 (I, 0)	-1.60 (I, 0)	-3.58 (I, 0)	-6.22* (I, 0)
GDP growth of world's advanced economies	-1.45 (I, 0)	-1.61 (I, 0)	-3.96* (I, 0)	-7.22* (I, 0)				

*Notes: (1) * indicates that the statistic is significant at 5% level of significance (2) The numerical figures in parentheses indicate the lag length for the augmented Dickey-Fuller test and the lag truncation for Barlett Kernel for Phillips-Perron test (3) 'I' indicates that the intercept is included.*

CHAPTER FOUR

FOREIGN DEBT INFLOWS IN SELECTED SUB-SAHARAN AFRICAN COUNTRIES

4.1 Introduction

The current discussions on international financial integration tend to emphasise the process that needs to be adopted in restructuring foreign debt towards long-term maturity. The discussions are motivated by the fact that, short-term debt is highly unstable and may expose countries to risks of sudden capital flow reversals, speculative currency attacks and banking crises. The exposure leaves the domestic economy with high costs of reforms in response to the recession (Buch and Lusinyan, 2000). As a result, countries in Sub-Saharan Africa are making efforts to encourage long-term investments. However, the World Bank's Global Development Finance (2010) shows that the share of short-term debt in foreign debt flows to Sub-Saharan Africa has increased from 9.03 per cent in 1987 to 18.9 per cent in 1999 and then to 24.7 per cent in 2008. This raises an important policy challenge for the region. The challenge is how to increase the costs of short-term capital flows and attract greater flows of long-term external finance.

There are a number of theories (including the works of Rajan 1992; Diamond 1993; Dasgupta and Ratha 2000; Mama, 2007; and Reinhart and Rogoff, 2009) that explain the maturity term structure of external debt flows. These theories suggest that institutional development, the relaxation of regulatory restrictions on external debt inflows, domestic financial development and currency crises are among the key potential determinants of the maturity mix of international capital flows. By their reasoning, institutional development generates incentives and reduces risks for investment while relaxation of regulatory restrictions on foreign capital inflows in an economy with a developed domestic financial system reduces the cost of capital movement (North, 1990 and Ishii and Hebermeier, 2002) thereby promoting inflows of long-term capital. Following their intuition, it can be hypothesised therefore that a country that strengthens its institutions, reduces its regulatory restrictions on the inflows of external capital and develops its domestic financial system can attract greater inflows of long-term capital relative to the short-term capital inflows. Despite the seemingly conventional wisdom in the hypothesis, the empirical

literature including Ishii and Habermeier (2002), Dasgupta and Ratha (2000) and Mama (2007), does not provide any conclusive evidence on the issue. The lack of consensus points to obvious differentials in terms of the impact of political institutions, regulatory restrictions and financial development on the maturity of capital flows, and thus necessitates case by case studies to unravel the actual determinants of the maturity of capital inflows.

While studies on the determinants of the maturity of international capital flows abound for Latin America, Asia and Europe (see Dasgupta and Ratha, 2000; Montiel and Reinhart, 1999; Rana, 1998; Cardenas and Barreras 1997; and Mama, 2007) the case is not necessarily so for Sub-Saharan Africa, the region that seems to be most in need of long-term capital inflows (Asiedu, 2002). This study seeks to fill the research gap. The significance of this study therefore lies in its quest to examine the impact of political institutions on the volume and composition of foreign debt inflows in selected Sub-Saharan African countries. [10] The intention of this study is also to investigate the effects of global conditions, overseas borrowing deregulation, international debt relief initiatives and domestic financial development on external debt inflows. Such findings will have far reaching policy implications.

The key value-addition of this essay is that it goes beyond the scope covered by Oatley (2009), Ndulu and O'Connell (1999) and Nelson (1990) who analysed the impact of political institutions on the accumulation of external debt. In our study, we focus on the effect of political institutions on the volume and maturity mix of external debt flows to 37 selected Sub-Saharan African (SSA) countries. In addition, the essay disaggregates external debt flows based on type or length of maturity. Finally, the essay analyses the contribution of international debt relief initiatives and the 2007-2009 global financial crisis to changes in the volume and maturity mix of foreign debt flows to selected SSA countries.

[10] Thirty-seven (37) Sub-Saharan African countries were selected for the study. These include 16 emerging and frontier market economies. The choice of sample countries for the study period covered is informed by data availability or limitations (see footnote 11 for list of countries studied and section 4.4 on justification for sample selection).

The rest of the paper is organised as follows. The next section reviews the existing theories on foreign debt maturity and the empirical studies that investigate the determinants of foreign debt maturity. Section three presents the working hypotheses and estimated empirical model. The sources of data and variables chosen for the study are discussed in section four. Section five presents and discusses the estimation results for long- and short-run foreign debt and the maturity-based composition of foreign debt flows. Finally, section six summarises the findings of the research and concludes the discussion by indicating the basic limitation of the study and offering some directions for future extensions of the research study.

4.2 Literature Review

There is a vast and growing body of literature that explains the volume of foreign capital flows. However, there are few theories and empirical studies that explain the maturity term structure of the flows. The body of literature that explains the volume and maturity of foreign debt capital includes studies by Rajan (1992), Diamond (1993), Rodrik and Velasco (1999), Dasgupta and Ratha (2000), Jeannaeu and Micu (2002), and Reinhart and Rogoff (2009). Factors mentioned as important determinants of the volume and maturity of foreign debt capital include asymmetric information and risk, global financial crisis, institutions, external financial liberalisation and country-specific macroeconomic fundamentals. Theories and empirical studies on the relationship between each of the mentioned factors and the maturity of foreign debt capital are reviewed in turn.

4.2.1 Asymmetric information and risk

Theoretical works that explain the roles of asymmetric information and risk in influencing the maturity of foreign debt capital include the models of Rajan (1992), Diamond (1993) and Rodrik and Velasco (1999). Rajan (1992) examines the role of asymmetric information in influencing an agent's choice between short- and long-term debt (that is, foreign bank loans and bond finance). According to Rajan (1992), superior information acquired by creditors equips them with higher bargaining power over the borrower agent. There is preference for short-term lending because the creditor agent has the explicit right to renegotiate contract terms. Similar work by Diamond (1993) considers the relationship between borrowers' access to private information about their

credit ratings and decision on debt maturity. In his work, Diamond (1993) makes a clear distinction between "good" and "bad" projects with the contention that owners of a good project have preference for short-term debt. On the contrary, owners of bad projects prefer only long-term debt. In addition, the size of control rents determines the maturity of a debt contract. In the case of sufficiently large control rents, the share of long-term debt will be comparatively high if borrowers prefer protecting control to information sensitivity.

The global financial crisis that occurred in the late 1990s motivated research into the relationships between debt maturity, the term structure of interest rates, and the possible occurrence of currency crises. Rodrick and Velasco (1999), for instance, assume the possibility of financing an investment project with short- and long-term debt. The project yields returns with certainty, implying no solvency risk. However, lenders could decide to withdraw their finance after a period during which a fixed liquidation value is assured. The liquidity risk causes a differentiation between short- and long-term lending rates. They suggest that the term structure of interest rates can be related to the share of short-term debt by outlining three separate conditions. These are: first, the equalization of short- and long-term interest rates with a risk-free international interest rate for low levels of short-term debt; second, a short-term interest rate that is lower than long-term rates for intermediate levels of short-term debt; and third, a risk premium-bearing interest rate for high levels of short-term debt finance. In sum, Rodrick and Velasco (1999) construct liquidity risk by means of the possibility of creditor agents refusing to roll over short-term debt.

4.2.2 *Currency-financial crises*

The first and second generation models of balance of payments crisis by Krugman (1979) and Calvo (2000) are also used to explain the theoretical relationship between currency-financial crisis and foreign debt. According to Krugman (1979), the basic causes of currency-financial crises are excessive spending by governments and expansionary monetary policies. Conditions under which the expansionary fiscal and monetary policies lead to financial crises are the combination of a fixed exchange rate regime, an independent monetary policy and free capital mobility. The expansionary fiscal and monetary policy brings about price increases and domestic currency appreciation, which in turn results in capital outflows. Attempts by the central bank to

preserve the exchange rate lead to the gradual decline in the government's foreign currency reserves. Sudden speculative attacks by investors lead to a further and rapid depletion of the remaining foreign currency reserves, resulting in a balance of payments crisis. The second generation models (including Calvo, 2000) also postulate that lack of transparency due to sovereignty and non-explicit government policy regulations are the major causes of crises. The lack of a transparent system brings about "country risks and uncertainty", in addition to the increased costs of acquiring knowledge about the profitability of investment projects. The heightened risks and costs of obtaining information lead to higher interest rates or the refusal by creditors to roll-over foreign currency short-term debt. Domestic banks also may find it difficult to fulfil their debt obligations especially when loans are in the form of illiquid projects. Hence, the central bank is compelled to draw on its reserves or negotiate for emergency loan from the international financial community. The first and second generation models of currency-financial crises of Krugman (1979) and Calvo (2000) have several implications for external debt flows and imbalances. First, substantial domestic currency depreciation, following speculative currency attacks, leads to capital outflows due to fears for the safety of financial institutions. This leads to a more rapid currency depreciation which increases the debt service burden in terms of the local currency amount needed for loan repayment. Second, the sudden reversals of short-term capital flows cause further declines in reserves to levels that make it difficult to meet foreign debt obligations. The affected countries may then resort to the international community for 'emergency loans', which are largely of a short-term nature. Episodes of financial crisis are commonly associated with excessive short-term private sector borrowing, and the large inflows of foreign loans lead to the accumulation of foreign debt (largely short-term debt).

Studies on the relationship between capital flows and financial crises include those by Williamson and Mahar (1999) and the International Monetary Fund (2009a). Williamson and Mahar (1999) studied the experiences of 35 economies in the 1990s, and found that 13 economies that had liberalised their financial sectors and capital accounts within five years, experienced financial crises after the liberalisation. They also provide evidence that net private capital flows increased, in excess of the threshold level of 3 per cent of GDP, within two to five years preceding the crisis or during the crisis itself. Furthermore, there were reversals of inflows during the crisis year. Inflows declined by more than 35 per cent from the two-year average prior

to the crises. The recent financial crisis which started with the housing industry crisis in the United States in 2007 is considered to have assumed a more global dimension than previous episodes of financial turmoil (the International Monetary Fund IMF, 2009a). In emerging markets, the initial impact was mainly through cross-border financial linkages (in the form of capital flows, the behaviour of investors in the stock markets and exchange rate changes). In the financially-less-developed countries, the effects of the crisis have been largely felt in the external trade sector and output growth with lags. According to the IMF study, the first group of countries to be hit by the crisis in Africa were the frontier and emerging markets because of their closer linkages with global financial markets. These countries are South Africa, Kenya, Nigeria and Ghana. The first round of impact of the crisis on these countries was in the form of capital flow reversals, declining equity markets, and exchange rate depreciation. Ghana and Kenya, for instance, had to postpone plans for external borrowing. South Africa and Nigeria also found it increasingly difficult to obtain external finance for banks and corporations. Reinhart and Rogoff (2009) and the IMF (2009a) showed that the global economic downturn led to a slowdown of growth in Sub-Saharan Africa. The impact of the global economic slowdown is worsened by the tightening of global credit which heightens risks for trade finance and other capital flows. In this essay, we present evidence that the global financial crisis has been associated with excessive borrowing of short-term foreign funds.

4.2.3 Institutions

The role of institutions in influencing the level and composition of capital flows is also analysed in both theory and empirical studies such as the study by Alfaro et al. (2003). More specifically, these studies relied on an index for law and order and indicate that good institutions encourage foreign capital inflows. Delechat et al. (2009) also used financial market institutions and property rights indexes as measures of institutional quality and found that the development of financial market institutions promotes private capital inflows. The contribution of political institutions to overseas borrowing and to the accumulation of external debt has received substantially less attention. In addition, studies that focus on the contribution of political institutions to changes in the maturity mix of foreign debt inflows are yet to be identified. The exceptions are Oatley (2009), and Ndulu and O'Connell (1999) who contend that different political institutions or

systems within which governments operate tend to generate different incentives to borrow and invest.

Democratic institutions allow society to constrain the behaviour of governments, while autocratic institutions constrain public participation in politics and national decisions. The hypothesis drawn from Oatley (2009), and Ndulu and O'Connell (1999) is that democratic institutions compel governments to borrow less frequently to finance consumption, and more frequently to finance investments, compared with autocratic institutions. Another inference that can be made from North (1990) and Nelson (1990) is that democratic institutions protect the economic system against abuse typical of most autocratic regimes, and have the capacity to nurture civil liberties and to secure property and contract rights, which in turn provide incentives for investment and the attraction of foreign finance.

In sum, the following conclusions can be drawn from identified literature. The first is that, countries with democratic systems of governance tend to borrow less of short-term funds than those with autocratic systems of governance, The second is that, since democratic institutions compel governments to borrow more frequently to finance investments, countries with more democratic systems of governance tend to borrow (or attract) more long-term funds compared with countries with autocratic regimes. The underlying argument is that investment projects are normally financed with long-term capital whilst non-investment activities, such as short-term stabilisation programmes, correction of fiscal imbalances, balance of payments problems and consumption expenditures are usually financed with short-term capital (Roberts, 1997; Jansen, N., 1997).

4.2.4 Financial liberalisation

Literature, including studies by Rana (1998) and Chumacero (1997), suggests that the impact of external financial liberalisation on the maturity mix of capital inflows depends on the nature of macroeconomic policies of the particular country. For instance, a combination of unrestricted capital mobility and a fixed exchange rate regime can produce very adverse consequences, including the encouragement of excessive short-term borrowing. Some proponents of capital decontrols, including Ishii and Habermeier (2002), propose that reducing restrictions on

international capital flows is best pursued against a background of a liberalised domestic financial sector, and sound and sustainable macroeconomic policies. They also suggest that the process of liberalising international capital inflows must begin with liberalising long-term flows, especially foreign direct investment inflows, ahead of short-term flows. A number of empirical studies (including those of Bartolini and Drazen, 1997; Montiel and Reinhart, 1999; Dasgupta and Ratha, 2000; Rana, 1998; and Cardenas and Barreras, 1997) confirm the hypothesis that limited liberalisation of capital inflows, in conjunction with responsible domestic macroeconomic policies, leads to a successful management of the extent of inflows of short-term capital. In a study for Latin America, Rana (1998) identified that a liberal capital accounts regime coupled with a vast magnitude of sterilisation measures forced domestic interest rates to increase rapidly, leading to an upsurge in short-term capital inflows in Chile and Colombia in the early 1990s. However, the implementation of selective controls in the form of discriminatory and unremunerated reserve requirements on overseas borrowing coupled with a reversal of the sterilisation activities helped to lengthen the maturity of the inflows in these two countries. Dasgupta and Ratha (2000) also explained that swift domestic and external financial liberalisation in borrowing countries, without sufficient regulatory and supervisory frameworks, accounts for upsurges in short-term debt inflows. Our contribution to research is that limited external financial liberalisation affects the maturity mix of foreign debt capital in Sub-Saharan Africa.

4.2.5 *Country-specific fundamentals*

Many of the identified studies, including those by Rodrik and Velasco (1999), Buch and Lusinyan (2000), and Jeannaeu and Micu (2002) found country-specific basic macroeconomic features and risks as important determinants of foreign debt maturity. For example, Rodrik and Velasco (1999) used panel data covering 32 developing economies and identified financial and economic development to be key determinants of the maturity of foreign debt. Buch and Lusinyan (2000) also identified foreign trade and regulatory restrictions as determinants of long-term foreign bank assets, but identified exchange rate volatility and GDP as determinants of short-term foreign bank assets. Similarly, Jeannaeu and Micu (2002) used a dataset covering the largest economies of Asia and Latin America and identified bilateral trade to be a major

determinant of long-term foreign lending. They identified exchange rate risk and financial market performance as major factors that explained short-term foreign lending in the 1990s.

4.3 Methodology

4.3.1 Hypotheses

This section presents the empirical model to be estimated. From existing theory and empirical studies, the following are our working hypotheses: (a) countries with democratic systems of governance tend to borrow comparatively less of short-term capital than those with autocratic regimes; (b) countries with more open and democratic systems of governance tend to attract more long-term loans; and (c) external debt inflows reduce during periods of global economic and financial crises. The study also seeks to confirm the assertion that the establishment of democratic institutions influences the composition of foreign debt of a country in favour of long-term debt inflows.

4.3.2 Empirical Model

The empirical model for analysing the maturity of foreign debt inflow follows the works of Nelson (1990), Ndulu and O'Connell (1999) and Buch and Lusinyan (2000) and is presented as follows:

$$Debt_{i,t} = \alpha_i + b_1 Debt_{i,t-1} + b_2 dem_{i,t-1} + b_3 aut_{i,t-1} + b_4 cs_{i,t}^{0709} + b_5 aqg_{i,t} + b_6 drel_{i,t} + b_7 dc_{i,t-1} + b_8 fblb_{i,t-1} + u_{i,t} \quad (4.1)$$

where:

$Debt$ = long-term or short-term foreign debt flows expressed as share of total GDP or the share of short-term debt in total foreign debt flow

dem = the first proxy for political institution, which is institutionalised democracy obtained from the World Bank's African Development Indicators, 2011.

aut = the second proxy for political institution, which is institutionalised autocracy obtained from the World Bank's African Development Indicators, 2011.

cs^{0709}= 2007-2009 crises period dummy

aqg = GDP growth in advanced countries, obtained from the IMF's Global Economic Outlook, 2011.

$drel$ = an index for countries benefiting from the Heavily-Indebted Poor Countries' (HIPC) and Multilateral Debt Relief (MDRI) initiatives.

dc = domestic financial depth measured as the ratio of domestic credit to GDP

$fblb$ = regulatory restrictions on overseas borrowing, measured by using the Kaminsky-Schmukler's (2003) chronology.

Equation 4.1 is modified to include an interaction term as a way of capturing the impact of economic recession or crisis in the advanced economies between 2007 and 2009, on debt flows to selected SSA countries. The modified equation is presented as equation 4.2.

$$Debt_{i,t} = \alpha_i + \beta_1 Debt_{i,t-1} + \beta_2 dem_{i,t-1} + \beta_3 aut_{i,t-1} + \beta_4 cs_{i,t}^{0709} + \beta_5 aqg_{i,t} + \beta_6 aqg * cs^{0709}{}_{i,t} + \beta_7 drel_{i,t} + \beta_8 dc_{i,t-1} + \beta_9 fblb_{i,t-1} + u_{i,t} \quad (4.2)$$

where:

$aqg * cs^{0709}$ = an interaction term for GDP growth in advanced economies and the 2007-2009 crises period dummy. The subscript 'i' = 1,2, ……..N sections, and periods t =1,2, …….T, with 'N' number of countries and T = 35 years, spanning the sample period 1975 to 2009 for 16 emerging and frontier market economies, 1980 to 2009 for the entire sample of 37 selected SSA countries and in separate regressions for HIPC beneficiary and non-HIPC countries. The intercept α_i is a country-fixed effect that controls for country-specific factors that do not vary over time. Subscript t-1 denotes one period lag term of the variables of interest.

Equation 4.1 is a model from which the unconditional marginal effect of growth performance in advanced countries on foreign debt flows to the selected SSA countries can be estimated. Equation 4.2 is an interaction model that includes an interaction term, $aqg * cs^{0709}$. The inclusion of the interaction term in equation 4.2 means that the effect of economic growth in advanced countries, aqg, on foreign debt inflows is conditioned upon the occurrence of a global financial crisis of the type that occurred between 2007 and 2009, cs^{0709}. Equations 4.1 and 4.2

suggest that economic growth in advanced countries has conditional and unconditional effects on foreign debt flows to the selected SSA countries. The unconditional marginal effect of growth in advanced countries on foreign debt flows to the selected SSA countries is represented by the parameter, b_4. The conditional marginal effect of growth in advanced economies on foreign debt inflows is represented by equation 4.3.

$\beta_4 + \beta_5 cs^{0709}{}_{i,t}$, if $cs^{0709}{}_{i,t}$= 1 i.e. exist or β_4 if $cs^{0709}{}_{i,t}$= 0. (4.3)

Estimation of the dynamic panel model involved the use of the system-generalised method of moments (GMM) estimator.[11] This corrects for potential endogeneity biases that may arise from the inclusion of the lagged dependent variable in the equation and produces consistent and efficient estimates. Estimating a panel model with a lagged dependent variable by ordinary least squares (OLS) estimator often leads to endogeneity biases and inconsistent estimates because by construction, the unobserved panel-level effects are correlated with the lagged dependent variables. Arellano and Bond (1991) normally recommend that the equation should be first-differenced and the lagged levels of the dependent variable must be used as instruments for the lagged differenced dependent variable. In addition, they recommend that the lag of some explanatory variables can be used as instruments for those variables, to account for the potential endogeneity of such variables. Arellano and Bond (1991) confirm that using the lagged difference results in a much more superior estimator. By first-differencing the equation, the Arellano-Bond estimator removes the panel level effects and uses instruments to form moment conditions. This estimation procedure is referred to as the first difference Generalized Method of Moments (GMM) estimator or the Generalized Method of Moments-Instrumental Variables (GMM-IV) estimator. It has the advantage of producing unbiased and consistent estimates. The number of potential instruments is huge. There is a wide range of possible instrumental variables for endogenous, predetermined and strictly exogenous explanatory variables. These can be used for single instrumental variable estimations.

[11] The weakness with the application of this kind of estimation approach to a dynamic panel data model with a large time series and a comparatively small cross-section of countries is the possible existence of a high time series bias in the data construct. Data constraints did not permit a wider coverage, in terms of the cross-section of countries covered for the sample period chosen in the first estimation.

A major setback of the Arellano and Bond estimator, however, is its failure to take advantage of all available moment conditions under standard assumptions (see Arellano and Bover, 1995 for details and explanation). As a result of that, the first-difference GMMM estimator produces consistent but inefficient estimates. To correct for this inherent weakness associated with the first-difference GMM estimator, Arellano and Bover (1995) and Blundell and Bond (1998) suggest a concurrent estimation of the model in both levels and first-differencing as a way of improving on the first-differenced GMM estimator. In this procedure, the first differenced variables are used as instruments in the level regression and the lagged values of the variables in levels are used as instruments in the first-differenced regression. The Arellano and Bover (1995) and Blundell and Bond (1998) estimator is known as the system-GMM estimator and is more accurate and efficient than the first-differenced GMM estimator. As a result, we employ the system-GMM estimator in our estimation of the dynamic panel data model. Lastly, an attempt is made to evaluate the soundness of the model specification by using the test for over-identifying constraints and the test of second order autocorrelation of the new residuals. The one-step system robust (sandwich) variance estimator was used to correct for biases associated with some types of misspecifications.

4.4 Data and Variable Definitions

Annual data for thirty-seven (37) selected countries in Sub-Saharan Africa were collected for the study. Of the sampled countries, sixteen (16) are referred to as emerging and frontier market economies and twelve (12) are beneficiaries of the HIPC and MDRI initiatives. The study was in three stages. The first stage involved an econometric analysis of the 16 emerging and frontier market economies in Sub-Saharan Africa covering a period of 35 years (from 1975 to 2009). The second stage involved an econometric analysis of the entire sample of 37 selected countries covering a period of 30 years (from 1980 to 2009).[12] The third stage separates HIPC and non-

[12] These are Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Democratic Republic of Congo, Republic of Congo, Cote d'Ivoire, Equatorial Guinea, Gabon, The Gambia, Guinea, Lesotho, Madagascar, Malawi, Mali, Mauritania, Niger, Sierra Leone, Swaziland and Togo, and the group of emerging and frontier market economies: namely Botswana, Cape Verde, Ghana, Kenya, Mauritius, Mozambique, Namibia, Nigeria, Seychelles, South Africa, Tanzania, Uganda, Zambia, Zimbabwe, Angola and Senegal.

HIPC countries. The HIPC countries are Benin, Burkina Faso, Madagascar, Malawi, Mali, Niger, Senegal, Sierra Leone, Ghana, Mozambique, Tanzania and Uganda.

Compared with other countries in Sub-Saharan Africa, the emerging and frontier market economies have developed and deregulated their domestic financial markets, reduced restrictions on external capital flows and offered competitive investment environments to attract investments. One of the objectives for these initiatives is to attract greater inflows of foreign capital. According to the definition of the International Monetary Fund (IMF), emerging markets refer to economies with financial and capital markets that are beginning to bear the features of matured stock markets in advanced countries. Other hall marks of emerging market economies include the achievement of a stable macroeconomic environment, strong economic growth, substantial international reserves and low debt ratio. Emerging markets have attracted the interest of investors because of the prospect of high returns and usually have sufficient financial infrastructure, but have less liquid equity and debt markets than the advanced economies. By this categorisation, South Africa is the only country that is considered as a truly emerging market economy in South Africa. Frontier market economies, on the other hand, refer to a group of low and middle income economies with financial and capital markets that have started gaining the attention and interest of foreign investors. They exhibit a relative openness to and accessibility for foreign investors, but the financial sectors are still small and exhibit low liquidity. They are in the early stages of financial market development, but the continued existence of market restrictions makes it difficult for them to be classified as truly emerging markets, and they are usually referred to as second-generation emerging market economies (International Monetary Fund, 2008). By this categorisation, Botswana, Ghana, Kenya, Mauritius, Mozambique, Nigeria, Tanzania, Uganda, Zambia, Zimbabwe, Angola, Senegal, Cape Verde, Namibia and Seychelles are considered as the frontier market economies in Sub-Saharan Africa.

The other 21 selected countries are largely a control group, without deregulations and the sophistications of financial markets found in the group of emerging and frontier market economies. For most of these countries, financial and capital markets are highly regulated, very small and illiquid, and a large part of debt and portfolio equity inflows are still subject to comprehensive de jure controls.

The rationale for collecting data on the diverse category of countries in the sub-region for the study is to compare the key factors influencing external debt inflows in the emerging and frontier market economies with those of the entire sample of 37 selected countries in Sub-Saharan Africa. Data constraints informed the choice of sample of countries for the regression analysis. Data for the analysis were obtained from the World Bank's World Development Indicators and International Monetary Fund's African Department. Data on output growth of advanced economies were obtained from International Monetary Fund's Global Economic Outlook (various issues). In addition, the construction of the index for external borrowing restrictions involved sourcing qualitative data from the IMF's Annual Reports on Exchange Arrangements and Exchange Restrictions and African Department. The chronology used by Kaminsky and Schmukler (2003) was adopted for the construction of the external borrowing restriction index. The study period is from 1975 to 2009 for the sample of emerging and frontier market economies and from 1980 to 2009 for the sample of 37 selected countries in SSA. The choice of countries was informed by data availability for the study.

4.4.1 Political institution

Empirical studies by Haggard and Kaufman (1992) and Nelson (1990) indicate that the political institutions within which governments function influence their borrowing decisions. In Sub-Saharan Africa, public sector borrowing remains a very significant component of total external borrowing, accounting for over 70 per cent of total external debt flows to the region.

Political institution is measured by use of two separate indices. The first measure of political institution is the index for institutionalised democracy which can be obtained from the World Bank's World Development Indicators 2010 database. The institutionalised democracy indicator consists of three important, mutually-dependent features. These are the assurance of civil liberties to all citizens in acts of political participation, the existence of established constraints on the exercise of power by the executive, and the presence of institutions and procedures through which citizens can effectively communicate their preferences about alternative policies and leaders (World Bank's World Development Indicators, 2010). Consequently, an advanced and well-organised democracy can be effectively defined as one in which political participation is open and free, a recruited executive is chosen by election, and restrictions on the powers of the

chief executive are substantial. The indicator score is an 11-point additive scale (0-10). The value '0' indicates no democracy and any value greater than '0' indicates some form of democracy. Higher values indicate higher levels of democracy. The value '10' indicates mature democracy (see Appendix A2.1 for further details). The second measure of political institution is the index for institutionalised autocracy which can be obtained from the World Bank's World Development Indicators 2010 database. The institutionalised autocracy indicator consists of three important features. These are the existence of: severe constraints on (and the suppression of) competitive political participation, few institutionalised constraints on the exercise of power by the executive, and limited civil liberties to all citizens (World Bank's World Development Indicators, 2010). Consequently, matured autocracy can be defined as a system in which competitive political participation is suppressed, the chief executives are recruited by means of an established process of selection by the political elites, and institutionalised constraints on the chief executive are few. The autocracy indicator score is an 11-point additive scale (0-10). The value '0' indicates no autocracy and the value '10' indicates mature autocracy. Any value that is greater than '0' indicates some form of autocracy. Higher values indicate higher levels of autocracy. The logic behind the construction and scaling of the institutionalised autocracy indicator is similar to that of the institutionalised democracy indicator, but the two indicator scales do not share any common grouping. Nelson (1990), Haggard and Kaufman (1992) and Olson (2000) hypothesise that autocratic institutions tend to borrow more from foreign lenders than democratic institutions. Ndulu and O'Conell (1999) also suggest that creditors favour short-term lending to countries with autocratic regimes due to perceived heightened 'country risks'.

4.4.2 *The 2007-2009 global financial crises and recession*

The 2007-2009 global crisis has resulted in the contraction of global credit and heightened risks for international finance. The 2007-2009 global crisis period is represented in the model by introducing a binary indicator that assigns the value '1' for the 2007-2009 crisis period and the value '0' for any other period. The impact of the crisis is determined by introducing an interactive term in the model. The interactive term is calculated as the 2007-2009 global crisis period dummy value multiplied by GDP growth rate in advanced economies. It gives us information about the impact of economic growth in advanced economies on foreign debt

inflows conditioned upon the occurrence of the 2007-2009 crisis.[13] Studies on the typology of financial crisis, including those by Reinhart and Rogoff (2009), indicate that global financial crisis periods and accompanying recessions are normally characterised by severe liquidity constraints which result in excessively high interest rates and reduced capital flows. It is hypothesised by Reinhart and Rogoff (2009) and the IMF (2009) that there is a reduction in global finance during periods of crisis and recession. Financial crisis and recession are however associated with excessive borrowing of short-term overseas funds by the most affected countries.

4.4.3 Debt relief

The Heavily Indebted Poor Countries (HIPC) initiative was first launched in 1996 by the IMF and the World Bank, with the basic aim of reducing the debt burden of the heavily indebted poor countries to manageable levels. The initiative was comprehensively reviewed and enhanced in 1999 to allow the Fund to offer faster, deeper and broader debt relief and to reinforce the link between debt relief, poverty reduction and social policies. It seeks to rescue the poorest countries from the poverty cycle by reducing their external debt. Due to the recurring difficulties faced by the beneficiary countries, the G8 member countries took a decision in 2005 to offer full relief to the HIPC countries on eligible debts owed to three multilateral institutions, namely, the IMF, the World Bank and the African Development Fund. The later initiative, referred to as the Multilateral Debt Relief initiative (MDRI), seeks to help accelerate progress toward meeting the United Nation's Millennium Development Goals (IMF, 2009b).

Debt relief and reductions are expected to create room for fiscal spending and borrowing as well as offer new opportunities for lending by foreign investors (IMF, 2008). Consequently, we introduce an index for countries that have benefited from the Highly-indebted poor countries' (HIPC) initiative and the multilateral debt relief initiative (MDRI). It ranges from '0' to '2' with '0' indicating no benefits from the debt relief initiatives and '2' indicating beneficiaries of both the HIPC and MDRI initiatives.

[13] A correlation coefficient test indicated that a significant fall in the growth of GDP in advanced economies is highly associated with periods of severe financial crises.

4.4.4 Financial development

A well-developed financial sector in a borrower country is associated with the creation of better financial institutions and regulatory framework. Also, strong financial institutions generate superior information on costs of domestic and external borrowing, and provide wider options to borrower countries. In addition, strong institutions reduce risks and uncertainties and offer greater incentives to lend to the borrower country. In addition, well-developed domestic equity and bond markets lessen the costs of liquidation of long-term debt and increase incentives for long-term lending (Hostland, 2009). Development of the financial sector is measured by the share of credit to private sector in total GDP (with a one-period lag). Higher levels of financial development lead to an increase in the volume and maturity of external finance.

4.4.5 Financial liberalisation

Dasgupta and Ratha (2000) and Montiel and Reinhart (1999) hypothesise that reducing restrictions on foreign capital flows in borrowing countries affects the maturity of external finance. An index for intensity of restrictions on overseas borrowing is used as measure of external financial liberalisation. The value ranges from '1' to '3', with '1' denoting highly restrictive regime and '3' indicating a highly liberalised system. The benchmark criteria for determining extent of liberalisation are presented in Table 4.1.

Table 4.1: Criteria for determining extent of liberalisation of overseas borrowing

Criteria for full liberalisation
In most cases, banks and other institutions are free to borrow from overseas, and the required minimum maturity should not exceed two years. It may be necessary for them to inform authorities, however, authorisation is granted automatically in most cases. Reserve requirements may be imposed, but at rates lower than 10 per cent.
Criteria for partial liberalisation
Banks and other institutions are permitted to borrow from overseas, but certain restrictions are imposed on such borrowing. The required minimum maturity range between two and five years. There might be some limits set on borrowing and certain regulatory requirements applicable to specific sectors. Reserve requirements range between 10 and 50 per cent.
Criteria for no liberalisation
Overseas borrowing by banks and other corporations are, in most instances, not permitted. The required minimum maturity might exceed five years. There might be limits set on borrowing and substantial regulatory requirements applicable to specific sectors. Reserve requirements exceed fifty per cent.

Note: Sourced from Kaminsky and Schmukler (2003).

4.5 Estimation Results

A causality test was done to determine the causal relationship between foreign debt inflows and institutionalised democracy. The test results indicate that the direction of causality does not run from the different types of foreign debt inflows to institutionalised democracy (see Tables A4.1 and A4.2 in Appendix A4). This implies that the volume and different types of foreign debt inflows are not the cause of the establishment of democratic institutions in the selected SSA countries. The results also confirm that the establishment of democratic institutions is exogenously determined in the estimated dynamic model. This study also reports on results obtained from estimating the dynamic panel model. The use of the System Generalized Methods of Moments (GMM) estimation corrects for biased and inconsistent estimates that emanate from the introduction of the lagged dependent variable in the equation. The diagnostic tests for the specification indicate that the model is well specified. Results of the diagnostic tests are reported in the respective Tables. These are the Arellano-Bond test for autocorrelation, the Sargan test for the validity of use of instruments and the Wald test for joint significance...The new residuals for the specification are, at times, auto-correlated of order 1, but not auto-correlated of order 2. The Sargan/Hansen test results also confirm the validity of the over-identifying restrictions and use of

the instruments. The Sargan test statistic is computed as the coefficient of determination multiplied by the number of observations from GMM-IV two-step estimation onto the set of exogenous variables. Its computation is based on the proposition that the residual term is uncorrelated with the set of instruments, which are in turn strictly exogenous. The statistic is asymptotically chi-squared with r-k degrees of freedom where r refers to the number of instruments and k represents the number of endogenous variables. The system estimator was combined with the sandwich variance estimator. The sandwich variance estimator produces unbiased estimates and is robust to some types of misspecifications. The more parsimonious regression results are presented in Tables 4.2 to 4.7. The preceding sub sections present the estimation results for the selected SSA countries.

4.5.1 Emerging and frontier market economies

The results presented in Tables 4.2 and 4.3 indicate that type of political institution, economic growth in advanced countries, the 2007-2009 global financial crises, and the liberalisation of overseas borrowing are important determinants of short term debt inflows in emerging and frontier market economies. The results also indicate that economic growth in advanced countries, the 2007-2009 global financial crisis and international debt relief initiative are important determinants of long term debt inflows in the SSA emerging and frontier market economies. The ratio of short term debt to foreign debt inflows is influenced by economic growth in advanced countries, the 2007-2009 global financial crisis, debt relief initiatives, domestic financial depth and changes to regulatory restrictions on overseas borrowing.

The coefficients for one period lagged value of external debt flows are positive and statistically significant. This suggests that success in attracting external finance in the previous period contribute significantly towards the ability of the selected countries to attract foreign loans in the current period. The results could also be a reflection of the creditworthiness of the selected countries. The estimation results also indicate that political institutions influence the volume of foreign debt inflows. The coefficients for institutionalised democracy and institutionalised autocracy are statistically significant and positively signed in the specification for the volume of short-term foreign debt inflows. This implies that countries with both systems of governance attract greater volumes of short-term debt inflows in SSA emerging and frontier market

economies. The coefficient for institutionalised democracy is also statistically significant and positively signed in the specification for the volume of long-term foreign debt inflows. This suggests that democratic systems of governance offer incentives for investments and attract greater volumes of long-term debt inflows in SSA emerging and frontier market economies. The results are consistent with the proposition by North (1990) and Nelson (1990), that countries with democratic systems of governance offer incentives for investment and the financing of investments. Institutionalised autocracy does not have any significant impact on the volume of long-term debt inflows. The results for the 16 emerging and frontier market economies in SSA confirm the hypothesis that countries with more open and democratic systems of governance tend to attract more long-term loan inflows, but fail to confirm the hypothesis that countries with democratic systems of governance tend to borrow comparatively less of short-term capital than those with autocratic regimes. The use of one-period lag values for political regime suggests that there is a time lag involved in the response of foreign investors to the establishment of democratic institutions in the 16 SSA emerging and frontier market economies.

Table 4.2: Foreign debt inflows (% of GDP) in 16 SSA emerging and frontier market economies

	Short term debt			Long term debt		
First order lagged dependent	0.200 (0.13)	-0.053** (-1.41)	-0.071** (-2.22)	-0.544 (-1.50)	0.358*** (4.41)	0.343*** (4.20)
Political institution (Institutionalised democracy index) [one period lag]	0.015 (0.69)	0.024** (3.01)	-0.010 (-1.18)	0.036* (1.71)	0.003 (0.47)	-0.001 (-0.09)
Political institution (Institutionalised autocracy index) [one period lag]	0.023* (1.78)			-0.010 (-1.58)		
GDP growth in advanced economies	-0.381 (-0.87)	0.192* (1.71)	0.230** (2.51)	-0.987 (-1.47)	-0.094 (-1.09)	-0.222** (-1.98)
2007-09 global financial crisis period dummy		-1.956* (-1.68)	-0.610* (-1.72)		3.707*** (3.36)	1.985*** (3.02)
Interactive term (GDP growth in advanced economies × 2007-09 crises period dummy)	1.148* (1.77)	0.493* (1.65)		0.619 (1.10)	-0.401** (-2.19)	
Index for HIPC and MDRI beneficiaries	-0.858 (-0.16)	-0.226 (-0.34)	-0.060 (-0.15)	-0.109 (-0.94)	-0.185* (-1.75)	-0.156* (-1.72)
Share of domestic credit to private sector in total GDP [one period lagged]	0.087 (1.49)	0.025 (1.30)	0.010 (0.70)	0.088 (1.26)	-0.018 (-1.07)	-0.018 (-0.95)
Overseas borrowing liberalisation index [one period lagged]	0.803 (0.22)	0.234* (1.70)	0.197* (1.97)	0.292 (1.54)	0.083 (0.40)	-0.285 (-1.00)
Constant	-0.849 (-1.47)	-1.192 (-0.49)	-1.447 (-0.57)	0.705 (1.60)	3.129*** (3.73)	1.652** (2.85)
Serial correlation test (1st order)	0.612	0.047	0.053	0.273	0.007	0.007
Serial correlation test (2nd order)	0.954	0.703	0.487	0.783	0.170	0.133
Wald test: Prob>chi-squared	0.000	0.003	0.000	0.075	0.001	0.000
Unconditional marginal effect of growth in advanced countries			*0.230*			*-0.222*
Conditional marginal effect of growth in advanced countries		*0.685*			*-0.401*	
Number of cross-sections used	428	488	481	428	488	481
Number of observation	16	16	16	16	16	16

*Note: Estimation of all equations included time dummies, not shown here. The t-statistics are in parentheses. ***, **, and * indicate significance at 1, 5 and 10% respectively*

Table 4.3: Share of short-term debt in foreign debt (%) in 16 SSA emerging and frontier market economies

First order lagged dependent	0.346 (0.53)	0.721*** (11.78)	0.747*** (10.36)
Political institution (Institutionalised democracy index) [one period lagged]	0.040* (1.91)	0.014 (0.94)	-0.005 (-0.12)
Political institution (Institutionalised autocracy index) [one period lag]	0.037* (1.89)		
GDP growth in advanced economies	0.204 (1.06)	0.434 (0.84)	1.093* (1.70)
2007-09 global financial crises period dummy	-13.599*** (-3.79)	-14.600** (-2.49)	-9.396*** (-2.69)
Interactive term (GDP growth in advanced economies × 2007-09 crises period dummy)	2.492*** (2.93)	1.702* (1.87)	
Index for HIPC and MDRI beneficiaries	-0.466* (-1.91)	0.762* (1.69)	-0.539 (-0.21)
Share of domestic credit to private sector in total GDP [one period lagged]	0.041* (1.90)	0.021 (0.37)	0.029 (0.57)
Overseas borrowing liberalisation index [one period lagged]	1.075* (1.74)	1.376 (1.56)	1.710*** (2.93)
Constant	0.8150* (1.92	2.724 (1.11)	-9.919* (-1.84)
Serial correlation test (1st order)	0.000	0.053	0.080
Serial correlation test (2nd order)	0.553	0.900	0.116
Sargan test	1.000	0.998	0.999
Wald test: Prob>chi-squared	0.000	0.001	0.010
Unconditional marginal effect of growth in advanced countries			*1.093*
Conditional marginal effect of growth in advanced countries		*1.702*	
Number of cross-sections used	479	489	482
Number of observation	16	16	16

*Note: Estimation of all equations included time dummies, not shown here. The t-statistics are in parentheses. ***, **, and * indicate significance at 1, 5 and 10% respectively*

The results also highlight the important contribution of global developments to the dynamics of foreign debt inflows in emerging and frontier market economies. The estimated coefficient for economic growth in advanced countries is statistically significant and positively signed in the specifications for the volume of short-term debt inflows and its share in external debt, in SSA emerging and frontier market economies, but negatively signed in the specification for the volume of long term debt inflows. This means that economic recession in the advanced

economies enhances profit opportunities of long-term investments in emerging and frontier market economies. The positive correlation between advanced country growth rate and short term debt flows could be explained by increasing interests in short term assets of SSA emerging and frontier market economies by investors from leading emerging economies, including China and India.

The estimated coefficient for the 2007-2009 crisis period dummy is statistically significant and negatively signed in the specifications for the volume of short-term debt inflows and its share in external debt inflows, but positively signed in the specification for the volume of long term debt inflows. This means that the 2007-2009 crisis period has been characterised by a significant decline in short-term debt inflows in SSA emerging and frontier market economies. The results can be explained by the tightening of global credit which, in turn increases the risk of short-term finance during the period of the crisis. The results for long-term debt flows could be explained by increased interests in Africa (particularly, in natural resource-rich countries) by investors from leading non-traditional emerging countries like China and India.

The estimated coefficient value for the interactive term is statistically significant and negatively signed in the specification for long term debt inflows but positively signed in the specifications for short term debt inflows (both in terms of volume and as share of total debt inflows). The estimation results for the interaction term and the advanced economy growth indicator suggest that economic growth in advanced countries have conditional and unconditional marginal effects on foreign debt flows to SSA emerging and frontier market economies. Higher growth performance in advanced economies is associated with an increase in short term debt inflows and a decrease in long term debt inflows, not only on occasions when the world is experiencing a financial crisis and an economic recession of the type that occurred between 2007 and 2009, but also on occasions when the world is not experiencing such crisis.

Another noted finding from the estimation is that success in application for international debt relief has reduced the volume of long-term debt flows but increased the share of short-term debt in total external debt flows to the beneficiary emerging and frontier market economies. Five emerging and frontier market economies benefit from the debt relief initiatives. These are Zambia, Ghana, Mozambique, Tanzania and Uganda. The reduction of regulatory restrictions on

overseas borrowing has also led to an increase in short term debt inflows, both in terms of volume and as share of foreign debt inflows in the SSA emerging and frontier market economies.

Contrary to a priori expectations, the estimation results do not confirm the hypothesis that domestic financial depth plays an essential role in the attraction of foreign finance. The estimation results concur with the Economic Commission for Africa (ECA) (2008) study that shows that the financial sector activities in African economies remain shallow.

4.5.2 Results for 37 selected SSA countries

The estimation results for all the 37 selected SSA countries are presented in Tables 4.4 and 4.5. The results of the diagnostic tests indicate that the model is well specified and there is at least, no second order autocorrelation of the new residuals. The study confirms the importance of institutionalised democracy in explaining foreign debt flows to the 37 selected SSA countries. Institutionalised democracy, economic growth rates in advanced economies, the 2007-2009 global financial and economic crisis, the benefits from international debt relief initiatives (where available), domestic financial depth and regulatory restrictions on overseas borrowing are important factors in explaining the volume and share of short-term debt inflows in the 37 selected SSA countries. The key determinants of long term debt inflows are institutionalised democracy, economic growth in advanced countries, international debt relief initiatives, domestic financial depth and regulatory restrictions on overseas borrowing.

The results indicate that the estimated coefficient value for the institutionalised democracy indicator is statistically significant and positively signed in the specification for the volume of long-term debt inflows, but negatively signed in the specification for the volume and share of short-term debt inflows. The results confirm the proposition by North (1990) and Nelson (1990) that countries with democratic systems of governance offer incentives for long-term investments. The results also indicate that the estimated coefficient for the institutionalised autocracy indicator is statistically significant and negatively signed in the specification for the volume of long-term debt inflows but positively signed in specification for the volume of short term debt inflows. This suggests that autocracy serves as a disincentive for the attraction of long-term finance. The results for the entire sample of 37 SSA countries confirm the hypothesis that countries with more

open and democratic systems of governance tend to attract more long-term loan inflows. They also confirm the hypothesis that countries with democratic systems of governance tend to borrow comparatively less of short-term capital than those with autocratic regimes. The estimated coefficient value for economic growth in advanced countries is statistically significant in the specification and positively signed in the specifications for the volume of short- and long-term debt inflows and the share of short-term debt in foreign debt inflows. The results could be influenced by increased interest in Africa by foreign investors from the previously non-traditional trading partners including China and India, whose actions are in turn motivated by their increased demand for natural resources. The interaction term for economic growth in advanced economies and the 2007-2009 economic crisis indicators is negatively correlated with the volume of short- and long-term debt inflows, but is positively correlated with the share of short-term debt in foreign debt. This suggests that growth in advanced countries have conditional and unconditional marginal effects on foreign debt flows to the 37 selected SSA countries (see Tables 4.4 and 4.5). A slow-down of growth in advanced countries is associated with a decrease in the volume of long- and short-term debt inflows in the absence of the 2007-2009 global financial crisis and recession, but an increase in the volume of long- and short-term debt inflows in the presence of the 2007-2009 global financial crisis and recession. Also, the estimated coefficient value for the crisis period dummy is statistically significant and positively signed in the specifications for short- and long-term foreign debt inflows. The results are possibly influenced by the increased inflow of capital from other leading world emerging market economies, particularly China and India. The crisis period has also been characterised by a decline in the share of short-term debt in foreign debt flows to the 37 selected SSA countries.

Similar to the results obtained for the 13 emerging and frontier market economies, the estimated coefficient value for the debt relief indicator is statistically significant and positively signed in the specification for the share of short term debt in total external debt inflows. It is negatively signed in the specification for the volume of short term debt inflows. This implies that success in benefiting from international debt relief initiatives has reduced the volume of external debt inflows in the selected countries but increased the share of short term debt in total external debt inflows in the selected countries but increased the share of short term debt in total external debt inflows in the selected countries. The results also show the importance of increased financial

depth and reduction of regulatory restrictions on overseas borrowing in attracting greater inflows of external debt in the sample of 37 selected SSA countries.

Table 4.4: Foreign debt inflows (% of GDP) in 37 selected SSA countries

	Short term debt			Long term debt		
First order lagged dependent	-0.008 (-0.05)	0.376*** (21.51)	0.018** (2.33)	0.280*** (7.34)	0.022*** (6.15)	0.049*** (4.46)
Political institution (Institutionalised democracy index) [one period lag]	0.004 (0.67)	-0.012*** (-5.83)	-0.061*** (-4.26)	-0.002 (-0.29)	0.003* (1.84)	0.028** (2.24)
Political institution (Institutionalised autocracy index) [one period lag]			0.067*** (4.64)			-0.033** (-2.50)
GDP growth in advanced economies	0.089** (2.52)	0.091*** (5.22)	0.063 (1.57)	0.148*** (4.72)	0.051* (1.76)	0.083 (1.53)
2007-09 global financial crises period dummy	-0.214 (-1.13)	7.573* (1.75)	6.236 (0.27)	0.076 (0.15)	8.731*** (2.70)	1.918 (0.11)
Interaction term (Advanced economies' GDP growth × 2007-09 crisis period dummy)		-2.057* (-1.86)	-1.559 (-0.26)		-2.788*** (2.78)	-0.532 (-0.12)
Index for HIPC and MDRI beneficiaries	-1.533* (-1.87)	0.144 (0.25)	-0.795*** (-3.04)	-0.511 (-1.47)	-0.634*** (-3.49)	0.176 (0.40)
Share of domestic credit to private sector in total GDP [one period lag]	0.043 (1.01)	0.006* (1.95)	0.046*** (5.38)	0.013 (0.98)	0.031** (2.55)	0.021 (1.60)
Overseas borrowing liberalisation index [one period lag]	3.117* (1.88)	0.378*** (3.80)	1.596*** (3.75)	0.324 (0.75)	-0.385 (-1.08)	-0.721*** (-4.26)
Constant	-4.642 (-1.63)	1.260*** (5.77)	-1.753*** (-7.57)	47.123 (0.21)	-1.450*** (-8.35)	0.680** (2.04)
Serial correlation test (1st order)	0.003	0.000	0.013	0.011	0.012	0.000
Serial correlation test (2nd order)	0.464	0.110	0.951	0.332	0.950	0.703
Sargan/ Hansen test	0.999	1.000	1.000	0.999	1.000	0.999
Wald test: Prob>chi-squared	0.000	0.000	0.000	0.000	0.000	0.000
Unconditional marginal effect of growth in advanced countries	*0.089*			*0.148*		
Conditional marginal effect of growth in advanced countries		*-1.966*			*-1.737*	
Number of cross-sections used	37	37	37	37	37	37
Number of observation	902	934	944	902	934	910

*Note: Estimation of all equations included time dummies, not shown here. The t-statistics are in parentheses. ***, **, and * indicate significance at 1, 5 and 10% respectively*

Table 4.5: Share of short-term debt in foreign debt (%) in 37 selected SSA countries

First order lagged dependent	0.142** (2.28)	0.661** (2.21)	0.044** (2.09)
Political institution (Institutionalised democracy index) [one period lag]	**-0.017*** **(-1.90)**	-0.002 (-0.58)	-0.029 (-1.12)
Political institution (Institutionalised autocracy index) [one period lag]			0.022 (0.81)
GDP growth in advanced economies	0.295*** (3.50)	0.136*** (3.30)	0.146*** (3.47)
2007-09 global financial crises period dummy	-0.325 (-1.09)	-15.842*** (-2.25)	-13.375*** (-2.27)
Interactive term (GDP growth in advanced economies × 2007-09 crises period dummy)		3.924** (3.56)	3.331** (2.16)
Index for HIPC and MDRI beneficiaries	-0.446 (-0.42)	0.439* (1.92)	0.775* (1.89)
Share of domestic credit to private sector in total GDP [one period lagged]	0.058** (2.17)	0.036*** (4.18)	0.051*** (5.59)
Overseas borrowing liberalisation index [one period lagged]	1.261 (1.20)	2.357*** (8.26)	2.320*** (3.55)
Constant	62.551 (0.35)	-0.660* (-1.68)	-0.182 (-0.52)
Serial correlation test (1^{st} order)	0.001	0.012	0.015
Serial correlation test (2^{nd} order)	0.137	0.126	0.116
Sargan/ Hansen test	0.999	1.000	1.000
Wald test: Prob>chi-squared	0.000	0.000	0.000
Unconditional marginal effect of growth in advanced countries	*0.295*		
Conditional marginal effect of growth in advanced countries		*4.060*	
Number of cross-sections used	37	37	37
Number of observation	803	954	864

*Note: Estimation of all equations included time dummies, not shown here. The t-statistics are in parentheses. ***, **, and * indicate significance at 1, 5 and 10% respectively*

4.5.3 HIPC and non-HIPC beneficiaries

Table 4.6 presents separate estimation results for the 12 HIPC beneficiary countries and the remaining 24 selected countries that are not benefiting from the debt relief initiatives. The results show that institutionalised democracy attracts greater inflows of long-term debt but reduces short-term debt inflows in the HIPC beneficiary countries. In non-HIPC benefiting countries, institutionalised democracy attracts greater inflows of short-term debt capital. The reduction in

short-term debt inflows in HIPC benefiting countries can be explained by the fact that HIPC countries are not allowed by the non-concessional borrowing rules, to borrow on non-concessional terms. The coefficient for institutionalised democracy is statistically significant and positively signed in the long-term debt specification for HIPC countries and short-term debt specification for non-HIPC countries, but negatively signed in the short-term debt specification for HIPC countries. Increasing autocracy is significantly and positively correlated with greater inflows of short-term debt only in non-HIPC countries. The results suggest that non-HIPC countries (irrespective of the type of political institution established) borrow comparatively more of short-term capital whilst HIPC countries with democratic institutions borrow more of long-term capital.

The estimation results indicate that global conditions have a significant influence on the volume and composition of foreign debt flows to the HIPC and non-HIPC countries. Economic growth in advanced countries has a significant and positive effect on the inflows of long- and short-term debt in HIPC and non-HIPC countries, and on the share of short-term debt in foreign debt in non-HIPC countries. The coefficient of the interaction term is statistically significant and negatively signed in the long-term debt specifications for HIPC and non-HIPC countries, but positively signed in the share of short-term debt specification for HIPC countries. The results suggest that output growth in advanced countries has conditional and unconditional marginal effects on the volume of long-term foreign debt in the HIPC and non-HIPC countries. Higher growth in advanced countries is positively correlated with an increase in the volume of long- and short-term debt flows to HIPC and non-HIPC countries without the occurrence of the 2007-2009 global financial crisis and recession, but a decrease in the volume of long-term debt flows to non-HIPC countries with the occurrence of the crisis and recession.

Table 4.6: Foreign debt inflows (% of GDP) in HIPC and non-HIPC SSA countries

	Long term debt		Short term debt		Short term debt (% of foreign debt)	
	HIPC	Non-HIPC	HIPC	Non-HIPC	HIPC	Non-HIPC
First order lagged dependent	0.269*** (3.69)	0.283*** (6.79)	-0.206*** (-4.04)	0.014 (1.12)	0.504*** (4.77)	0.697*** (5.77)
Political institution (Institutionalised democracy index) [one period lagged]	0.001 (0.01)	-0.004 (-1.29)	-0.006** (-1.96)	0.011*** (5.65)	-0.013* (-1.93)	-0.008 (-1.35)
GDP growth in advanced economies	0.765*** (2.99)	0.141** (2.14)	0.197* (1.79)	0.084*** (2.92)	0.062 (0.22)	0.148** (2.35)
2007-09 global financial crisis period dummy	-0.412 (-0.41)	-0.095 (-0.13)	0.213 (0.35)	-0.081 (-0.18)	0.950 (0.75)	0.301 (0.59)
Share of domestic credit to private sector in total GDP [one period lagged]	-0.026 (-0.40)	0.006 (0.42)	0.024 (0.48)	0.015* (1.70)	0.039 (0.43)	0.024* (1.91)
Overseas borrowing liberalisation index [one period lagged]	-0.191 (-0.64)	1.797** (2.59)	0.249 (0.73)	1.969*** (4.25)	1.627** (2.38)	2.340*** (3.69)
Constant	-2.760 (-1.15)	1.153* (1.79)	-0.651 (-0.49)	-1.837*** (-3.14)	-1.916 (-1.08)	-0.450 (-0.67)
Serial correlation test (1^{st} order)	0.003	0.000	0.002	0.028	0.003	0.049
Serial correlation test (2^{nd} order)	0.149	0.624	0.711	0.817	0.467	0.137
Sargan test: prob>chi-squared	0.999	0.999	1.000	1.000	1.000	1.000
Wald test: Prob>chi-squared	0.000	0.000	0.000	0.000	0.000	0.000
Number of cross-sections used	281	583	281	583	281	534
Number of observation	12	25	12	25	12	25

*Note: Estimation of all equations included time dummies, not shown here. The t-statistics are in parentheses. ***, **, and * indicate significance at 1, 5 and 10% respectively*

Table 4.7: Foreign debt inflows (% of GDP) in HIPC and non-HIPC SSA countries

	Long term debt		Short term debt		Short term debt (% of foreign debt)	
	HIPC	Non-HIPC	HIPC	Non-HIPC	HIPC	Non-HIPC
First order lag dependent	0.269*** (8.95)	0.378*** (10.87)	-0.047 (-0.40)	0.012 (0.63)	0.387 (1.22)	0.789*** (16.87)
Political institution (Institutionalised democracy index) [one period lag]	0.009* (1.78)	-0.002 (-0.81)	-0.006* (-1.68)	0.011*** (5.00)	-0.007 (-1.23)	-0.007 (-0.72)
Political institution (Institutionalised autocracy index) [one period lag]	-0.018 (-1.19)	-0.007 (-0.71)	0.025 (0.47)	0.014*** (3.40)	-0.012 (-0.65)	0.007* (1.98)
GDP growth in advanced economies	0.765*** (2.99)	0.050 (0.88)	0.502* (1.67)	0.112** (2.25)	0.382 (1.40)	0.289** (2.36)
2007-09 global financial crisis period dummy	-1.109 (-0.26)	8.651** (2.34)	-8.795 (-0.13)	-2.119 (-0.78)	-6.297*** (-2.80)	-1.058 (-0.60)
Interactive term (GDP growth in advanced economies × 2007-09 crises period dummy)	-0.360** (-2.34)	-2.242** (-2.34)	1.947 (0.11)	5.440 (0.78)	1.660*** (2.84)	2.504 (0.57)
Share of domestic credit to private sector in total GDP [one period lag]	-0.025 (-0.40)	0.005 (0.50)	0.262* (1.69)	0.024*** (2.80)	0.012 (0.07)	0.031** (1.99)
Overseas borrowing liberalisation index [one period lag]	0.190 (0.64)	1.459*** (2.82)	0.186* (1.93)	1.548*** (4.28)	-0.417 (-0.44)	0.525 (0.34)
Constant	-2.760 (-1.15)	1.327*** (3.91)	-10.072* (-1.80)	-2.063*** (-11.14)		-0.546 (-0.54)
Serial correlation test (1st order)	0.003	0.005	0.342	0.027	0.032	0.046
Serial correlation test (2nd order)	0.149	0.147	0.505	0.789	0.772	0.141
Sargan test: prob>chi-squared	1.000	1.000	1.000	1.000	1.000	1.000
Wald test: Prob>chi-squared	0.000	0.000	0.000	0.000	0.000	0.000
Conditional marginal effect of growth in advanced economies	*0.405*	*-2.242*			*1.660*	
Unconditional marginal effect of growth in advanced countries			*0.502*	*0.112*		*0.289*
Number of cross-sections used (observation)	281 (12)	583(12)	281(12)	583(12)	281(12)	534(12)

*Note: Estimation of all equations included time dummies, not shown here. The t-statistics are in parentheses. ***, **, and * indicate significance at 1, 5 and 10% respectively*

Also, the estimated coefficient value for the crises period dummy is statistically significant and negatively signed in the specification for the share of short-term debt in foreign debt in the HIPC countries, but positively signed in the long-term debt specification for the non-HIPC countries. The results suggest that the 2007-2009 global financial crisis has been characterised by a significant change in the composition of foreign debt in favour of short-term debt in HIPC countries, but an increase in the volume of long-term debt flows to the non-HIPC countries. This could be explained by increased interest in Africa by foreign investors from leading emerging economies such as China and India.

The results indicate that increasing the depth of the domestic financial sector development leads to an increase in the inflow of short-term debt in the HIPC and non-HIPC countries and influences the composition of foreign debt in favour of short-term debt. Furthermore, a reduction in regulatory restrictions on overseas borrowing is an essential pre-requisite for the attraction of foreign debt flows to HICP and non-HIPC countries.

By comparison, institutionalised democracy has led to an increase in the volume of short term debt inflows in non-HIPC countries, but a decrease in the volume of short term debt inflows in HIPC beneficiary countries. Also, increased domestic financial depth and reduction in regulatory restrictions on overseas borrowing have led to an increase in the volume of short-term debt inflows in non-HIPC countries but have no significant influence on the volume of short-term debt inflows in HIPC beneficiary countries. The differences in findings could be explained by the fact that HIPC countries are subject to the conditionality not to borrow on non-concessional terms.

4.6 Conclusions and Recommendations

This study has empirically examined the impact of political institutions and global developments, including the 2007-2009 global economic and financial crisis, on the maturity of foreign debt inflows, by type and composition, in selected Sub-Saharan African countries.

Our findings confirm the hypothesis that countries with more open and democratic institutions borrow less of short-term capital from overseas than those with autocratic institutions. This

applies to the analysis for the entire sample of 37 SSA countries. In the selected sample of 16 emerging and frontier market economies, both types of institutions, namely democracy and autocracy, have led to the attraction of greater inflows of short-term debt capital. Secondly, the study finds evidence to support the proposition that countries with more open and democratic systems of governance tend to attract more long-term loan inflows. This applies to the entire sample of 37 SSA countries, the selected sample of 16 emerging and frontier market economies and the selected sample of 12 HIPC beneficiary countries. Thirdly, non-HIPC countries (irrespective of the type of political institution established) borrow comparatively more of short-term capital whilst HIPC beneficiary countries with more open and democratic institutions borrow more of long-term capital. Fourthly, findings from the study confirm the assertion that the maturity mix of foreign debt capital changes in favour of long-term debt capital in countries with more open and democratic institutions. Additionally, our findings indicate that global developments play an important role in determining the flows of foreign debt to the selected SSA countries. The proposition that foreign debt inflows decline during periods of global financial crisis, is validated in the study findings for short-term debt flows to the 16 emerging and frontier market economies, but rejected in the study findings for the entire sample of 37 SSA countries. Foreign debt flows to the entire sample of 37 SSA countries increased during the 2007-2009 global financial crisis period, which in turn suggests a possible influence of investors from leading emerging economies, including China and India. The nature of the influence of economic growth in advanced countries on international debt flows to selected SSA countries depends on the occurrence of a global financial crisis and an economic recession. Furthermore, the research findings suggest that countries that benefit from international debt relief initiatives receive less of the volume of debt inflows but an increase in the proportion of short-term debt in foreign debt inflows. Also, an increase in domestic financial depth contributes leads to the attraction of greater foreign debt capital in the entire sample of 37 SSA countries. Our findings also confirms the reduction of regulatory restrictions on overseas borrowing as an essential pre-requisite for successful attraction of greater foreign debt capital to the selected SSA countries. Lastly, there are differences in how institutional development, increased domestic financial depth and reduction in regulatory restrictions on overseas borrowing affect the volume of foreign debt flows to the HIPC beneficiary and non-HIPC countries.

Tentative recommendations can made from the research findings. Firstly, Sub-Saharan African countries aiming to attract greater inflows of long-term debt capital and to alter the maturity mix of international debt capital toward more long-term debt capital must pursue political reforms by building democratic institutions. Secondly, SSA countries that are heavily-indebted but are not yet beneficiaries of the HIPC and MDRI initiatives could apply to join the initiatives or take alternative measures to reduce their external indebtedness. Political reforms towards the development of democratic institutions lead to a change in the composition of foreign debt capital in favour of long-term debt capital in countries that have taken steps to reduce their external indebtedness. Thirdly, SSA countries must develop their domestic financial markets. This could be done by encouraging greater domestic savings, building financial infrastructure and deregulating activities in the domestic financial sector to enhance efficiency, increase competition and consequently improve on financial intermediation. These measures would help to increase domestic financial depth and attract greater inflows of foreign loans. Lastly, reduction of regulatory restrictions on overseas borrowing is essential for the attraction of foreign debt capital.

The basic limitation of the study was inadequate data. In addition, studies of this nature are usually saddled with overwhelming difficulties, including the limited usefulness of partial equilibrium (single equation) models. The study offers useful implications for future research. Future studies could be conducted to determine the contribution of other types of institutions and regulatory measures to the attraction of foreign finance with different terms of maturity in developing economies. This recommendation is based on the assertion that the quality of institutions matters in the attraction of foreign finance with long term maturity.

4.7 References

Alfaro, L., Kalemi-Ozcan, S. and Volosovych, V. (2003): “Why doesn’t capital flow from rich to poor countries? An Empirical Investigation”, *Working Paper* 040, Harvard Business School: Boston, Massachusetts.

Arellano, M. and Bond, S. (1991): "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations", *Review of Economic Studies* 58, 277-297.

Arellano, M. and Bover, O. (1995): “Another look at the instrumental variable estimation of the error components models”, *Journal of Econometrics* 68(1), 29-51.

Asiedu, E. (2002): “On the determinants of foreign direct investment to developing countries: is Africa different?”, *World Development* 30 (2002 January), 107-119.

Bartolini, L. and Drazen, A. (1997): “Capital account liberalization as a signal”, *NBER Working papers* 5725, National Bureau of Economic Research: Massachusetts.

Blundell, R., and Bond, S. (1998): “GMM estimation with persistent panel data: an application to production functions”, *The Institute for Fiscal Studies Working Paper Series* W99/4.

Buch, C., and Lusinyan, L. (2000): “Determinants of short-term debt”, *Kiel Working Paper* 994, Kiel: Kiel Institute of World Economics

Calvo, G .A. (2000): “Balance of payments in emerging markets: large capital inflows and sovereign governments”, In P. Krugman (eds.), *Currency crises*, 71-104, (Chicago: University of Chicago Press).

Cardenas, M. and Barreras, F. (1997): “On the effectiveness of capital controls: The experience of Colombia during the 1990s”, *Journal of Development Economics* 54 (1997), 27-57.

Chumacero, R.A., Raul, L. M., Felipe, L. B. (1997): “What determines capital inflows?: an empirical analysis for Chile”, *mimeo*, Catholic University of Chile: Chile.

Dasgupta, D. and Ratha, D. (2000): "What factors appear to drive private capital flows to developing countries? And how does official lending respond?", World Bank Working Paper 2392.

Delechat, C., Ramirez, G.,Wagh, S. and Wakeman-Linn, J. (2009): "Sub-Saharan Africa's integration in the global financial markets", *IMF Working paper* 09/114, May: International Monetary Fund.

Diamond, D.W., (1993): "Seniority and maturity of debt contracts", *Journal of Financial Economics* 33, 341–368

Eichengreen, B. J. and Portes, R. (1986): "Debt and default in the 1930s: Causes and consequences", *European Economic Review* 30(3), 599-640.

Haggard, S. and Kaufman, P. R. (1992): *Politics of economic adjustment: International constraints, distributive conflicts, and the state*: Princeton: Princeton University Press.

Hostland, D. (2009): "Low income countries' access to private debt markets", Policy Research Working Paper 4829, the World Bank, January 2009

International Monetary Fund (2009a): *Impact of the global financial crisis on Sub-Saharan Africa*. African Department, IMF 2009

International Monetary Fund (2009b): *Factsheet.* External Relations Department, the IMF. 2009.

International Monetary Fund, Regional Economic Outlook: Sub-Saharan Africa *in World Economic and Financial Surveys*. Washington D.C.: IMF Publication Services, April, 2008.

Ishii, S. and Habermeier, K. (2002): "Capital account liberalisation financial sector stability", *IMF Occasional Paper* 211, 2002.

Jansen, N. (1997): "Crisis, conditions and capital: the effect of the IMF on direct foreign investment", *Journal of Conflict Resolution* 48. April.

Jeannaeu, S. and Micu, M. (2002): "International bank lending to emerging market countries: explaining the 1990s roller coaster", *BIS Quarterly Review*, March, 52-64.

Kaminsky, G. and Schmukler, S. (2003): "Short-run pain, long-run gain: The effects of financial liberalisation", *IMF Working Paper* No. 03/34, Washington, DC.

Krugman P. (1979): "A model of balance of payments crisis", *Journal of Money, Credit and Banking* 11, 311-332

Loayza, N., Romain R., Luis S. and Jaume V. (2007): "Macroeconomic volatility and welfare in developing countries: An introduction", *The World Bank Economic Review* 21(3), 343-357

Mama, A. T. (2007): "On the maturity structure of foreign debt contracts in emerging countries", University of Montreal - Department of Economics.

Montiel, P. and Reinhart, C. M. (1999): "Do capital controls and macroeconomic policies influence the volume and composition of capital flows?: Evidence from the 1990s", *Journal of Money and International Finance* 18, 619-635.

Ndulu, B. J. and O'Connell, S. A. (1999): "Governance and growth in Sub-Saharan Africa", *The Journal of Economic Perspectives* 13, 41-66.

Nelson, J. M., (1990): *Economic crisis and policy choice: the politics of adjustment in developing countries*. Princeton: Princeton University Press.

North, D. C. (1990): *Institutions, institutional change and economic performance*, New York: Cambridge University Press, 1990.

Oatley, T. "Political institutions and foreign debt in the developing world", Department of Political Science, UNC at Chapel Hill *Memeo*

Olson, M. (2000): *Power and prosperity: Outgrowing communist and capitalist dictatorships*. New York: Basic Books.

Portes, R. and Rey, H. (2005): "The determinants of cross-border equity flows", *Discussion Paper* No. 446 (London: Centre for Economic Performance)

Raddatz, Claudio. (2007): "Are external shocks responsible for instability of output in low-income countries?" *Journal of Development Economics* 84, 155-187.

Rajan, R. G. (1992): "Insiders and outsiders: The choice between informed and Arm's-length debt", Journal of Finance 47 (4), 1367-1400, September.

Rana, P. B. (1998): "Controls on short-term capital inflows – The Latin American Experience and Lessons for DMCs", *EDRC Briefing Notes* 2, September (Asian Development Bank Economics and Development Resource Centre).

Reinhart, C. and Rogoff, K. (2009): "This time it's different: eight centuries of financial folly", MPRA Paper 17452, September 2009 http://mpra.ub.uni-muenchen.de/17452/

Roberts, S. (1997): "Monetary policy within macroeconomic policy: an appraisal in the context of reconstruction and debt", *Transformation* 32, 55-78.

Rodrik, D., and Velasco, A. (1999): "Short-term capital flows", *NBER Working Paper* 7364, Cambridge, MA: National Bureau of Economic Research (NBER).

Williamson, J. and Mahar, M. (1998): "A survey of financial liberalisation", Essays in International Finance 211. Princeton University: Princeton, November.

World Bank: *Global Development Finance*, 2010.

Appendix A4

Table A4.1: Panel causality test for 16 SSA emerging and frontier market economies

Null hypothesis	No. of observation	F-statistic	Probability
(1) Institutionalised democracy does not Granger cause long-term foreign debt inflow	396	1.929	0.147
(2) Long-term foreign debt inflow does not Granger cause institutionalised democracy		0.395	0.674
(1) Institutionalised democracy does not Granger cause short-term foreign debt inflow	396	2.182	0.114
(2) Short-term foreign debt inflow does not Granger cause institutionalised democracy		0.048	0.953
(1) Institutionalised democracy does not Granger cause total foreign debt inflow	396	1.155	0.316
(2) Total foreign debt inflow does not Granger cause institutionalised democracy		0.121	0.886

Note: Lags: 2 Sample: 1975 to 2009

Table A4.2: Panel causality test for 37 SSA countries

Null hypothesis	No. of observation	F-statistic	Probability
(3) Institutionalised democracy does not Granger cause long-term foreign debt inflow	1028	0.005	0.995
(4) Long-term foreign debt inflow does not Granger cause institutionalised democracy		1.608	0.201
(3) Institutionalised democracy does not Granger cause short-term foreign debt inflow	1028	0.924	0.397
(4) Short-term foreign debt inflow does not Granger cause institutionalised democracy		0.319	0.727

Note: Lags: 2 Sample: 1980 to 2009

CHAPTER FIVE

INTERNATIONAL CAPITAL FLOWS AND INVESTMENT VOLATILITY IN SELECTED SUB-SAHARAN AFRICAN COUNTRIES

5.1 Introduction

The increase in international capital flows, accompanied by a series of economic crises, in the past three decades has given rise to concerns about the impact of the flows on national economies (Reinhart and Rogoff, 2009). This, in turn, has led to an intensive debate, among academics and policymakers, about the impact of international financial integration. An important feature of the ensuing debate is how the increased capital flows affect investment volatility (Calderon and Schmidt-Hebbel, 2008; Pallage and Robe, 2003).

It is hypothesized by Backus et al. (1992), Razin and Rose (1994), and Hirata et al. (2004) that increased cross-border capital flows enhance substitution possibilities between domestic and foreign investments, and hence, increase investment volatility. Razin and Rose (1994), also contend that the impact of international capital mobility on investment volatility depends on the persistence of productivity shocks. Studies, including those by Razin and Rose (1994), Denizer et al. (2000), Grenade (2004), and Hirata et al. (2004), have examined the impact of international capital flows on investment volatility. However, these studies do not provide any clear evidence on the link between capital flows and investment volatility.

Although studies on the relationship between capital flows and domestic investment in Africa have been identified, those that examine the relationship between capital flows and the volatility of investment are yet to be identified (see, for example, Khan, 2011; and Ndikumana, 2008). In addition, while studies on the relationship between international capital mobility and investment volatility have been identified for Europe, MENA countries and the Eastern Caribbean Currency Union (see Hirata et al., 2004; Grenade, 2004; Denizer et al., 2000; and Razin and Rose, 1994) the case is not necessarily so for Sub-Saharan Africa (SSA), one of the regions that seem to be most in need of stable and high rates of investments (Ndikumana, 2003). This study seeks to fill the research gap. The significance of this study therefore lies in its quest to examine the impact of international capital flows on investment volatility in selected Sub-Saharan African countries.

The intention of this study is also to disentangle the effects of international capital flows on investment volatility. Such findings will have far reaching policy implications. This study adds value to research by explaining the time dynamics of investment volatility in selected SSA countries. [14]

The rest of the paper is organised as follows. The next section reviews literature on the relationship between international capital flows and investment volatility. Section three reviews literature on other determinants of investment volatility. The hypotheses and estimated empirical model are presented in section four. Section five provides the sources of data used for the study, as well as the definitions and measures of the chosen variables. The estimation results for investment volatility are presented and discussed in section six. Finally, section seven summarises the findings of the research and concludes the discussion by indicating the basic limitation of the study and offering some directions for future extensions of the research study.

5.2 International capital flows and investment volatility

Theoretical literature, including the works of Backus et al. (1992) and Hirata et al. (2004), predict that international financial integration should increase investment volatility. When restrictions on cross-border capital flows are reduced, the possibilities of substituting foreign for domestic investments increase, which in turn leads to an increase in investment volatility. However, Razin and Rose (1994) argue that the impact of increased capital mobility on investment volatility is also determined by the nature of the underlying productivity shocks. If shocks are persistent and country-specific, increased capital mobility would heighten investment volatility. Conversely, when shocks are common across countries, the impact of increased capital mobility on investment volatility would be ambiguous. When shocks to productivity are transitory and common across countries, the easing of restrictions on cross-border capital flows

[14]The selected countries are South Africa, Nigeria, Botswana, Ghana, Kenya, Mauritius, Mozambique, Namibia, Zambia, Uganda, Tanzania, Seychelles, Cape Verde, Senegal, Zimbabwe and Angola. These are referred to as emerging and frontier market economies. These countries have, to an extent, developed their domestic financial markets offered competitive investment environments to attract investments. One of the key objectives for these initiatives is the attraction of greater foreign capital flows (International Monetary Fund, 2008).

would not affect investment spending, because of the resultant changes in international interest rates. Razin and Rose (1994) show that the impact of transitory shocks on investment behaviour is marginal, because a non-persistent shock does not lead to a significant change in the expected discounted sum of future profits. In the case of an irreversible investment, a transitory shock may not have any impact on investment.

Empirical studies, including those by Razin and Rose (1994), Hirata et al. (2004) and Grenade (2004), have examined the relationship between international capital flows and investment volatility, but none of these studies focused on Sub-Saharan Africa. Razin and Rose (1994), for instance, examined the impact of capital mobility on investment volatility for a panel 133 countries. Hirata et al. (2004) conducted a study on the impact of capital flows and investment volatility for MENA countries. Grenade (2004) focused on the Eastern Caribbean Currency Union. The identified empirical studies do not provide any conclusive evidence on the relationship between international capital flows and investment volatility. In a panel study for 133 countries, Razin and Rose (1994) used the augmented Dickey-Fuller unit root test to examine shocks and identified a high degree of persistence in shocks which are also common across countries. By using the instrumental variables model, Razin and Rose did not find the extent of capital mobility to be significantly correlated with investment volatility. Studies that identified a negative relationship between financial integration and investment volatility include Hirata et al. (2004) for MENA countries and Denizer et al. (2000) for a panel of 70 countries. Grenade (2004) also conducted a study for the Eastern Caribbean Currency Union (ECCU) but identified financial integration to be associated with rising investment volatility.

Studies by Khan (2011) and Ndikumana (2008) examined the impact of resource inflow on the level of domestic investment in Cameroon and Sub-Saharan Africa respectively, but none of these studies analysed its impact on the volatility of investment. Khan (2011), for instance, identified private capital inflows to be an important determinant of private investment in Cameroon. Ndikumana (2008) also identified foreign direct investment to crowd-in domestic investment in SSA countries. Studies that explore the relationship between capital flows and the volatility of investment in SSA are yet to be identified.

5.3 Other determinants of investment volatility

A number of other important factors explaining investment volatility have been identified in previous studies examining macroeconomic volatility and these include output growth, domestic financial depth, inflation volatility and quality of institution. These are discussed in turn.

5.3.1 Output growth

Dasgupta and Ratha (2000) and Hernandez et al. (2001) contend that a fast-growing economy is likely to create a congenial environment for higher future earnings and hence higher rates of returns, in addition to reduced risk of investments. This, in turn, leads to the attraction of greater investments and the achievement of more stable rates of investments. Empirical studies, including Ahmed et al. (2005), show that higher output growth in previous periods indicates brighter growth prospects, which in turn, leads to the attraction of greater investments. Studies that examine the impact of economic growth performance on investment volatility are, however, yet to be identified.

5.3.2 *Domestic financial depth*

According to Calderon and Schmidt-Hebbel (2008), one of the mechanisms by which agents diversify risk and smooth shocks is accessing credit from the domestic financial market. Deep financial markets make credit available for direct investments and offer investors funds needed to meet their short and long term needs. Studies, including Denizer et al. (2002) and Easterly et al. (2001), identified deep financial markets to lead to lower macroeconomic volatility. Mileva (2008) also confirms the hypothesis that domestic financial depth increases the rate of investment.

5.3.3 Inflation volatility

Another factor that leads to higher investment volatility is macroeconomic instability, usually measured by inflation volatility. Literature, including Agosin and Mayer (2000) and Grenade (2004), indicates that high and volatile inflation increases the uncertainty of investments and heightens risk of long-term investments.

5.3.4 Political instability and institution

The role of political climate and institutions in influencing the level of investment is also analysed in theory and empirical studies such as the studies by Alfaro et al. (2003), Furstenberg (1998), North (1990), Nelson (1990), Oatley (2009) and Vo (2005). Alfaro et al. (2003) and North (1990) suggest that political instability and weak institutions tend to have an adverse effect on investments. They suggest that a favourable political climate and strong democratic institutions create an incentive for investments. When the political climate is unstable, investors become reluctant to spend large amounts of resources on fixed investments. North (1990), Furstenberg (1998) and Vo (2005) also indicate that a secure institutional foundation is an important pre-requisite for attracting investments. They indicate that strong institutions offer property and investor rights protection and thereby generate incentives for investments. In particular, North (1990) and Nelson (`1990) cite the important role of political institutions in attracting investments. They mention that democratic institutions often protect the economic system against abuse the typical of most autocratic regimes, and have the capacity to nurture civil liberties and to secure property and contract rights, which in turn provide incentives for investments. Calderon and Schmidt-Hebbel (2008) identified political risk to be strongly correlated with output volatility. While studies on the response of the level of investment to changes in the political climate and institutions abound, the case is not necessarily so for the response of the volatility or stability of investment, an essential determinant of high and sustained economic growth. The contribution of this essay to research is that a stable political climate and a strong democratic institution are important for the achievement of stable rates of investments in SSA countries.

5.4 Methodology

5.4.1 Hypothesis

The following is our basic working hypothesis drawn from a survey of theory and empirical literature: *increased inflow of foreign capital heightens investment volatility*.

5.4.2 Empirical model

Our model for estimation follows the works of Agosin and Mayer (2000), Prasad et al. (2003) and Calderon and Schmidt-Hebbel (2008) on the determinants of investment and macroeconomic volatility, and is presented as follows:

$$\delta_{i,t}^{I} = \eta_i + k_1\delta_{i,t-1}^{I} + k_2 fkiq_{i,t-1} + k_3 Q_{i,t-1} + k_4\delta_{i,t-1}^{INF} + k_5 dc_{i,t} + k_6\delta_{i,t}^{dc} + k_7 pol_{i,t} + k_8 dem_{i,t} + \varepsilon_{i,t} \quad (5.1)$$

where: $\delta_{i,t}^{I}$ = investment volatility obtained from estimating a GARCH model for gross capital formation; $fkiq_{i,t-1}$ = ratio of foreign capital inflows (aggregate or disaggregated by type) to GDP lagged one-period; $Q_{i,t-1}$ = output growth lagged one-period; $\delta_{i,t-1}^{INF}$ = inflation volatility measured as the standard deviation of the level of inflation lagged one-period; $dc_{i,t}$ = domestic credit to the private sector, measured as the share of domestic credit to the private sector in GDP; $\delta_{i,t}^{dc}$ = volatility of *dc* measured as the standard deviation of the share of domestic credit to the private sector; $pol_{i,t}$ = political climate, using weighted conflict index provided by the Databanks International; $dem_{i,t}$ = quality of institution, using the index for institutionalised democracy ; and $\varepsilon_{i,t}$ = disturbance term. The subscript: 'i' = 1, 2, …….N cross sections, and periods t = 1, 2, …….T, with 'N = 13' number of countries and T = 35 years, spanning the sample period 1975 to 2009. The subscript: 't-1' denotes one-period lag. The notation, 'η_i' denotes the intercept.

Estimation of the dynamic panel model involved the use of the system-generalised method of moments (GMM) estimator.[15] This corrects for potential endogeneity biases that may arise from the inclusion of the lagged dependent variable and some explanatory variables in the equation. In addition, the system-GMM estimator enhances the precision and efficiency of the estimates (see Appendix A8 for detailed notes on justification).

[15] The weakness with the application of this kind of estimation approach to a dynamic panel data model with a large time series and a comparatively small cross-section of countries is the possible existence of a high time series bias in the data construct. Data constraints did not permit a wider coverage, in terms of the cross-section of countries covered.

In addition to the panel study for SSA emerging and frontier market economies, a time series regression analysis is conducted for South Africa where data on portfolio investment inflows is sufficiently available. The decision to do so is justified by the absence of sufficient data on portfolio investment for all the selected countries. We first investigated the time series properties of the variables by use of the augmented Dickey-Fuller (ADF) unit root test. This was followed by diagnostic tests for the presence of serial correlation of the residuals, using the Durbin-Watson d-statistic, the Breusch-Godfrey LM test and the Durbin's alternative test for autocorrelation. The diagnostic test results are presented in Tables A5.1 and A5.2 in Appendix A5. The Cochrane-Orcutt and Prais-Winsten regression was used for the time series analysis of the determinants of investment volatility in South Africa (see Appendix A5.2 for details on justification and discussion of the procedure).

5.5 Data and variable definition

Annual data for sixteen emerging and frontier market economies in Sub-Saharan African covering a period of 35 years (from 1975 to 2009) were collected for the study, and employed a dynamic panel regression analysis. [16] These economies have, to an extent, developed and deregulated their domestic financial markets and offered competitive investment environments to attract investments. They have attracted considerable inflows of international capital and are becoming increasingly integrated with international financial markets. With the exception of Mozambique and Angola, they have also reduced regulatory restrictions on international capital flows.

Data on gross domestic investment, gross domestic output, output growth, domestic credit ratio, inflation and the institutionalised democracy index were obtained from the World Bank's World Development Indicators 2010. Annual data on foreign capital inflows, including foreign direct investment, loans and portfolio investment inflows were obtained from the International Monetary Fund's International Financial Statistics and Balance of Payments Statistics. Data for the weighted conflict index for the political environment were obtained from the Databanks

[16] See paragraph 2, section 2.5 in Chapter Two of the thesis for details on the definition of emerging and frontier market economies.

International. Based on a review of existing literature, this study also provides the definitions and measurements of the variables chosen for the study.

5.5.1 Investment volatility

Most of empirical studies have computed volatility by using the standard deviation over a rolling window; say three- to-five year rolling averages. A large number of alternative measures have also been based on the standard deviation measure around a simple time trend. However, these measures have shortcomings. One of the limitations with the use of this measure is that it entails loss of observations at the beginning of sample, as the computations provide an average value for the window's length. Another limitation is that volatility measures such as standard deviation and the coefficient of variation are deemed to overemphasize variability in non-trending series. The squaring of the values of these volatility measures also has a tendency to worsen the problem of outliers (Canova, 1998; Offut and Blandford, 1986). Literature, including Nelson (1992), identifies the simple ARCH and related models as the most appropriate for assessing changes in volatility over time.

To account for the time dynamics of volatility, this study estimates volatility by using the following GARCH (1, 1) model:

$$I_t = X_t\rho + \varepsilon_t \quad (5.2)$$

$$\sigma_t^2 = \mu + \alpha_1\varepsilon_{t-1}^2 + \beta_1\sigma_{t-1}^2 \quad (5.3)$$

where I_t is the gross capital formation, X_t is a vector of exogenous or pre-determined variables which includes a one-period lag dependent variable, one-period lag output growth, interest rate and foreign direct investment. Equation 5.2 is a mean equation for investment, based on the neoclassical assumption that the desired level of capital stock is a positive function of the expected growth of the difference between actual output and the full-capacity output. Consistent with the modifications by Agosin and Mayer (2000), the equation also assumes that foreign investments form part of the total investments of a country and may have an influence on domestic investment in the recipient country. The use of one-period lag output growth rate in the mean equation reflects the investment accelerator effect and assumes adaptive expectation by

postulating that expected output growth depends on output growth in the previous period. Binary indicators for external and domestic financial liberalisation are introduced in variance equation 5.3 to capture the impact of the financial period on investment volatility.

The notation σ_t^2 is the variance of the disturbance term from the mean equation (equation 5.2); μ is the mean; $\varepsilon_{t-1}^2$is the one-period lag of the squared residual from the mean equation which indicates news about volatility from the previous period; and σ_{t-1}^2 is last period's forecast variance. The (1, 1) in the GARCH (1, 1) indicates the presence of a first-order GARCH term and a first-order ARCH term.

The model was estimated for individual countries. The advantage of individual country regressions is that it allows heterogeneity in the estimated coefficients. The sum of the coefficients, $\alpha_1+\beta_1$, is a measure of volatility persistence. For a well-specified variance function, the sum of the coefficients must be less than 1.

5.5.2 Measurements and definitions

The main explanatory variable in the model is foreign capital flows, which is made up of foreign direct investment, foreign debt flows and portfolio equity flows. International capital flows are expressed as shares of GDP, and reflect a quantity-based measure of international financial integration. Backus et al. (1992), Razin and Rose (1994) and Hirata et al. (2004) hypothesise that increased cross-border capital flows heighten investment volatility.

Measurements of the control variables are also presented in turn. One of the control variables is domestic financial depth, which is measured as the share of domestic credit to private sector in GDP and reflects availability of domestic credit to finance investment. Kose et al. (2006) hypothesise that deeper financial markets reduce investment volatility. The next control variables are political climate and institution, which are respectively proxied by the weighted conflict index obtained from the Data-Banks International and the institutionalised democracy index obtained from the World Bank's World Development Indicators 2010. The value of the weighted conflict index ranges from '0' to '9', with '0' indicating political stability (no conflict) and '9' indicating high political instability (extreme conflict). The value of the institutionalised

democracy index ranges from '0' to '10', with '0' indicating strong autocracy and '10' indicating strong democracy (see Appendix A2.1 for further details). Alfaro et al. (2003) postulate that stable political climate and strong institutions creates incentives for reduced uncertainty in investments. A third control is macroeconomic uncertainty, which is proxied by inflation volatility. Inflation volatility is measured as the ratio of standard deviation of quarterly consumer price index inflation to its mean value over a four-quarter (a one-year) window. Prasad et al. (2003) hypothesise that stable macroeconomic environment reduces cost of investment and leads to the attraction of greater investments.

5.6 Estimation results

The first stage of the estimation exercise employs the GARCH (1, 1) model to estimate volatility measures for investment. The GARCH (1, 1) was fitted for each of the 16 selected countries to determine the suitability of the model as a good descriptor of the volatility of investment. The results from estimating the variance equation for investment are presented in Table 5.1 below.

Table 5.1: Estimation of the GARCH (1, 1) model

	Constant	ARCH (1) (α_1)	GARCH (1) (β_1)	γ_1	γ_2	Log-Likelihood
Botswana	0.0005	-0.245	1.053***	0.006	-0.004	68.273
Cape Verde	0.0006	-0.141	1.073**	0.001	-0.001	45.502
Ghana	0.001	-0.230***	1.087***	-0.002	-0.005	39.186
Kenya	0.005	-0.184*	1.018***	-0.001	0.001	70.794
Mauritius	0.004	-0.268	1.099***	0.005**	-0.002	75.571
Mozambique	0.004	-0.217***	1.186***		0.001*	51.522
Namibia	0.003	-0.156*	1.060***	0.001	-0.002	48.641
Nigeria	0.006**	-0.129	0.826	-0.001	0.002	55.59
Seychelles	0.003	-0.334	0.918*	0.018	0.004	26.315
South Africa	0.001	-0.235***	0.971***	-0.001	0.001	89.051
Tanzania	0.001	-0.279	0.578	-0.003	0.001	71.377
Uganda	0.007	0.025	0.620	-0.001	0.001	65.262
Zambia	0.002	0.680**	-0.110	0.006	-0.007	44.686
Senegal	0.004	0.460***	-0.186	0.008***	0.004	174.21
Zimbabwe	0.002	-0.214***	0.971*	0.003	0.004**	69.98
Angola	0.003	-0.086	0.424	-0.001	-0.002	77.52

Notes: *, **, *** *denote significance at 10%, 5% and 1% level of significance. The notations* γ_1 *and* γ_2 *respectively denote the coefficient values for external and domestic financial liberalisation.*

The estimated coefficients of the variance equation for 11 out of the selected 16 countries were found to be significant at least at the 10% level. Altogether 10 out of the 16 countries also exhibited comparatively high coefficients estimates, whilst the parameter estimates for Uganda, Zambia, Tanzania, Senegal and Angola were low – they were statistically insignificant. In order to validate the hypothesis that investment volatility increases during periods of external financial liberalization, we introduced a time dummy variable for external financial liberalization for each country in the respective variance equations. Mauritius and Senegal are the only countries for which external financial liberalisation had a significant impact on investment volatility. Also, Mozambique and Zimbabwe are the only countries for which domestic financial liberalization had a significant impact on investment volatility. Investment volatility increased in Mauritius and Senegal during periods of external financial liberalization, and in Mozambique and Zimbabwe during periods of domestic financial liberalization. Agenor et al. (2000) and Canova (1998) show that the size of the summed-up value of the ARCH and GARCH terms in the variance equation is a measure of persistence in volatility shocks. When the summed-up value of the coefficients of ARCH and GARCH terms is equal to unity, the suggestion is that volatility shocks die out slowly; hence lower values of the summed-up terms indicate that volatility shocks die out much faster.

In 10 out of the 16 selected countries, the persistence measures were at least close to unity, indicating the persistence of an integrated GARCH phenomenon and underlining continual changes in the volatility of investment. Whilst investment volatility persistence was highest in Botswana, Cape Verde, Ghana, Kenya, Mauritius, Mozambique, Namibia, South Africa, Uganda and Zimbabwe, the level of investment volatility was least in Tanzania, Senegal and Angola.

Table 5.2: Volatility persistence in investment

	Volatility Persistence, ($\tau = \alpha_1 + \beta_1$)
Botswana	0.808
Cape Verde	0.932
Ghana	0.857
Kenya	0.834
Mauritius	0.831
Mozambique	0.969
Namibia	0.904
Nigeria	0.697
Seychelles	0.584
South Africa	0.736
Tanzania	0.299
Uganda	0.645
Zambia	0.570
Senegal	0.274
Zimbabwe	0.750
Angola	0.338

5.6.1 Investment volatility

The second stage of the regression involved the estimation of the impact of external capital flows on investment volatility. Findings from the estimation results are presented as Table 5.3 below. The diagnostic tests for the dynamic specification indicate that the model is well specified. The new residuals for the specification are, at times, auto-correlated of order 1, but not auto-correlated of order 2. The Sargan test results also confirm the validity of the over-identifying restrictions and use of the instruments. The regression results for the level of investments are presented as Table 5.3.

Overall, the regression results indicate that both aggregated and disaggregated foreign capital inflows lead to reduced investment volatility in the selected countries. Foreign direct investment, loan and portfolio investment inflows lead to reduced investment volatility in the SSA emerging and frontier market economies. Other identified key determinants of investment volatility are domestic financial depth, domestic credit volatility, political instability and inflation volatility. The regression results also provide evidence of persistence of shocks in emerging and frontier market economies of Sub-Saharan Africa.

The coefficients for aggregated and disaggregated foreign capital inflows in the previous period are negatively signed and statistically significant. This indicates that international capital inflows lead to reduced investment volatility in the emerging and frontier market economies and suggests that international capital inflows augment domestic capital, improve finance available for financing investments and consequently reduce investment volatilities in the emerging and frontier market economies.

The results also show that domestic financial depth, in the form of an increase in the share of domestic credit to private sector in GDP, is significantly and negatively correlated with investment volatility in the emerging and frontier market economies. This suggests that increasing domestic financial depth leads to reduced investment volatility in the emerging and frontier market economies. In addition, a volatile domestic financial market contributes significantly to increased investment volatility in the emerging and frontier market economies in Sub-Saharan Africa.

The results also indicate that the political climate indicator is significantly and positively correlated with investment volatility in the specifications. This implies that an unstable and unfavourable political climate contributes significantly to unstable investments in the selected countries. Macroeconomic uncertainty is also found to be an important determinant of investment volatility in the selected countries. The coefficient for inflation volatility is positively signed and statistically significant in the specifications. This suggests that macroeconomic instability, proxied by inflation volatility, creates uncertainty, increases costs and risks, and thus exacerbates the investment volatility in the selected countries. One-period lagged output growth and the quality of political institution are not identified as important determinants of investment volatility in the selected countries.

Table 5.3: System dynamic regression for investment volatility

	Investment volatility	Investment volatility	Investment volatility
1st order lag dependent	0.016 (0.22)	1.695* (1.78)	0.046 (0.91)
Foreign capital inflow [one period lag]			-0.211* (-1.91)
FDI inflow [one period lag]	-0.299*** (-2.80)	-0.217** (-2.15)	
Foreign loan [one period lag]	-0.326* (-1.93)	-0.310* (-1.84)	
Portfolio investment inflow [one period lag]	-0.683** (-2.10)	0.089 (0.80)	
Political institution (institutionalised democracy)		-0.008 (-0.79)	0.009 (0.93)
Political climate (weighted conflict index)		0.011* (1.69)	0.014* (1.79)
Domestic credit to private sector ratio [one period lag]	-0.087*** (-3.00)	0.011 (1.58)	-0.002 (-0.23)
Domestic credit ratio volatility		0.149* (1.67)	0.144* (1.76)
Inflation volatility [one period lag]		0.112** (2.17)	0.120*** (2.68)
Output growth (%) [one period lag]	0.045 (0.30)	0.054 (1.18)	0.016 (0.77)
Constant	0.513** (2.40)	0.549** (2.29)	0.466** (2.08)
Sargan test	1.000	1.000	1.000
Serial correlation test (1st order)	0.014	0.549	0.017
Serial correlation test (2nd order)	0.177	0.252	0.390
Wald test: prob> chi2	0.003	0.004	0.005
No. of observation	482	484	485
No. of cross-section	16	16	16

*Note: All regressions include time effects, not reported here. The t-statistics are in parentheses. ***, **, and * indicate 1, 5 and 10% level of significance.*

Next, we report our findings from the time series analysis of the determinants of investment volatility in South Africa. We begin the analysis by testing for the stationarity of the series by using the Augmented-Dickey Fuller (ADF) and Phillips-Perron (PP) tests (see Table A5.1 in Appendix A5 for test results). The test results indicate that all the series are stationary in levels. We also run a regression using the OLS estimator and conduct diagnostic tests for the presence of autocorrelation in the residuals. All the diagnostic tests, namely the Durbin-Watson d-statistic,

the Breusch-Godfrey LM and Durbin's alternative tests, suggest the presence of serial correlation in the residuals (see Table A5.2 in Appendix A5). Consequently, we resort to the use of the Cochrane-Orcutt and Prais-Winsten regression to correct for the presence of autocorrelation. The transformed Durbin-Watson statistic is closer to 2.0 compared with the original Durbin-Watson statistic, and suggests that the Cochrane-Orcutt and Prais-Winsten regression corrects for the presence of serial correlation in the residuals.

Table 5.4: Prais-Winsten AR(1) regression – iterated estimates for South Africa

Investment volatility	Coefficient	Standard Error	t-statistic	P>|t|
1st order lag dependent	0.335	0.154	2.17	0.041
FDI inflow [one period lag]	-0.297	0.202	-1.47	0.156
Foreign loan [one period lag]	-0.057	0.221	-0.26	0.797
Portfolio investment inflow [one period lag]	-0.370	0.098	-3.77	0.001
Political institution (institutionalised democracy)	-0.010	0.008	-1.23	0.233
Political climate (weighted conflict index)	0.179	0.076	2.37	0.027
Domestic credit to private sector ratio [one period lag]	0.013	0.009	1.40	0.174
Inflation volatility [one period lag]	-0.043	0.066	-0.66	0.517
Output growth (%) [one period lag]	-0.004	0.087	-0.05	0.963
Constant	0.371	1.291	0.29	0.777
Rho	-0.374			
Durbin-Watson statistic: original transformed	 2.479 2.275			
Adjusted R-squared	0.485			

The results indicate that the first order lag dependent variable, one-period lag value of portfolio investment inflow and the weighted conflict index are the key determinants of investment volatility in South Africa. The coefficient of the first order lag dependent variable is statistically significant and positively signed, suggesting that shocks to investment are persistent in South Africa. One-period lag value of portfolio investment inflow is negatively correlated with investment volatility, suggesting that portfolio investment inflow reduces investment uncertainty in South Africa. Lastly, the coefficient of the weighted conflict index is statistically significant

and has a positive sign, suggesting that an unfavourable political climate exacerbates instability in the rate of investment in South Africa. FDI and foreign loans inflow, political institution, domestic credit to the private sector, inflation volatility and one-period lag value of output growth were not found to be important determinants of investment volatility in South Africa.

5.7 Conclusions and Recommendations

This study examined the impact of foreign capital flows on investment volatility in emerging and frontier market economies in Sub-Saharan Africa. We employed a dynamic panel approach (GMM-IV).

Overall, the study fails to accept the hypothesis that foreign capital exacerbates investment volatility. Foreign direct investment, foreign debt and portfolio investment inflows instead reduce investment volatility in emerging and frontier market economies in Sub-Saharan Africa. Other key determinants identified in the study are the development and stability of the domestic financial sector, political climate and inflation volatility.

Tentative recommendations can be made from the research findings. First, the ability to achieve stable rates of investments requires the attraction of greater inflows of international capital. This must be complemented with development of the domestic financial sector, maintenance of a stable domestic financial market and creation of a stable political climate. A key lesson from the study is that countries that have developed their financial markets and have succeeded in attracting international capital flows, in addition to maintaining political stability, are successfully in their drive towards the achievement of a stable growth in investments.

The basic limitation of the study is the inability to appropriately capture the long-term impact of foreign portfolio investment on the level of investment in emerging and frontier market economies in Sub-Saharan Africa. This is because the recorded information on foreign portfolio investment flows to most Sub-Saharan African countries is only recent. In spite of that, findings from the study offer useful implications for future studies. In view of the fact that foreign loan and portfolio investment inflows influence total direct investment through their influence on

domestic financial markets, future studies could focus on an econometric analysis of the impact of foreign capital flows on the development of domestic financial markets in emerging and frontier market economies in Sub-Saharan Africa.

References

Agenor, P. R., McDermott, C. and Prasad, E. (2000): "Macroeconomic fluctuations in developing Countries", *World Bank Review 14, 251-285*.

Agosin, M. R. and Mayer, R. (2000): "Foreign direct investment in developing countries: does it crowd in domestic investment", *UNCTAD Paper 146*. February 2000.

Ahmed, F., Arezki, R. and Funke, N. (2005): "The composition of capital flows: is South Africa different?" *IMF Working Paper 05/40*. (Washington, D. C.: International Monetary Fund).

Alfaro, L., Kalemi-Ozcan, S. and Volosovych, V., (2003): "Why doesn't capital flow from rich to poor countries?: An empirical investigation", *Working Paper 040* Harvard Business School, Boston, MA.

Backus, D. K., Kehoe, P. J. and Kydland, F. E. (1992): "International real business cycles", *Journal of Political Economy 100-4, 745-775*.

Calderon, C. and Schmidt-Hebbel, K. (2008): "Openness and growth volatility", *Central Bank of Chile Working Papers Number 483*: Central Bank of Chile.

Canova, F., (1998): "De-trending as business cycle facts: A user's guide", *Journal of Monetary Economics 41, 533-540*.

Cochrane, D. and Orcutt, G. H. (1949): "Application of least squares regression to relationships containing auto-correlated error terms", *Journal of the American Statistical Association* 44, 32–61.

Dasgupta, D. and Ratha, D. (2000): "What factors appear to drive private capital flows to developing countries? And how does official lending respond?" *World Bank Working Paper* 2392

Denizer, C. A., Iyigun, M. F. and Owen, A. (2002): "Finance and macroeconomic volatility", *The B.E. Journal of Macroeconomics* 2(1), Article 7.

Denizer, C. A., Iyigun, M. F. and Owen, A. (2000): "Finance and macroeconomic volatility", *Policy Research Working Paper 2487*: The World Bank.

Easterly, W., Islam, R. and Stiglitz, E. (2001): "Shaken and stirred: explaining growth volatility", In B. Pleskovic and N. Stern (Eds.), Annual World Bank Conference on Development Economics.

Furstenberg, V. G. M. (1998): "From worldwide capital mobility to international financial integration: a review essay", *Open Economies Review 9, 53–89*.

Grenade, K., (2004): "Financial integration and macroeconomic volatility in the ECCU", In: Proceedings of the 36th Annual Monetary Studies Conference, Trinidad and Tobago November 1–4, 2004.

Hernandez, L., Mellado, P. and Valdes, R. (2001): "Determinants of private capital 447 flows in the 1970s and 1990s: is there evidence of contagion", *IMF Working 448 Paper 01/64*.

Hirata, H., Kim, S.H. and Kose, M.A. (2004): "Integration and fluctuations: the case of MENA", *Emerging Markets Finance and Trade 40 (6), 48–67*.

International Monetary Fund: Regional Economic Outlook - Sub Saharan Africa in World Economic and Financial Surveys, April 2008.

Khan, S. A. (2011): "Volatility of resource inflows and domestic investment in Cameroon", AERC Research Paper 221, African Economic Research Consortium: Nairobi. January 2011.

Kose, A.M., Prasad, E., Rogoff, K. and Shang-Jim, W., (2006): "Financial globalization: a reappraisal", *IMF Working paper 06/189*: International Monetary Fund.

Mileva, E. (2008): "The impact of Capital flows on domestic investment in transition economies", *European Central Bank Working Paper Series Number 871*.

Ndikumana, L. (2003): "Capital flows, capital account regimes, and foreign exchange rate regimes in Africa", *Working Paper 55*, Political Economy Research Institute, University of Massachusetts: Amherst.

Ndikumana, L. and Verick, S. (2008): "The linkages between FDI and domestic investment: Unravelling the developmental impact of foreign investment in Sub-Saharan Africa", *IZA Discussion Paper 3296*, Institute for the Study of Labour: Bonn.

Nelson, J. M., (1990): *Economic crisis and policy choice: the politics of adjustment in developing countries*. Princeton: Princeton University Press.

Nelson, D. B. (1992): "Filtering and forecasting with misspecified ARCH models I: Getting the right variance with the wrong model", *Journal of Econometrics, 52, 61-90*.

North, D. C. (1990): *Institutions, institutional change and economic performance*. New York: Cambridge University Press.

Oatley, T. (2009): "Political institutions and foreign debt in the developing world", Department of Political Science, UNC at Chapel Hill *Mimeo*

Offut, S. E. and Blandford R. (1986): "Commodity Market Instability: Empirical Techniques and Analysis", *Resource Policy 12, 67-72*.

Pallage, S. and Robe, M. (2003): "On the welfare cost of economic fluctuations in developing Countries", *International Economic Review 44 (2), 677–698*.

Prais, S. J., and Winsten, C. B. (1954): "Trend estimators and serial correlation", *Working Paper* 383, Cowles Commission. http://cowles.econ.yale.edu/P/ccdp/st/s-0383.pdf.

Prasad, E., Kenneth, R., Shang-Jin, W. and Ayhan, M. (2003): "Effects of financial globalization on developing countries: some empirical evidence", *The International Monetary Fund (March)*.

Razin, A. and Rose, A. K. (1994): "Business-cycle volatility and openness: an exploratory cross-sectional analysis". In L. Leiderman and A. Razin (Eds.), *Capital Mobility: The Impact on Consumption, Investment, and Growth*, 48–76, Cambridge: University Press.

Reinhart, C. and Rogoff, K. (2009): "This time it's different: eight centuries of financial folly", *MPRA Paper No. 17452*, September 2009. <http://mpra.ub.unimuenchen.de/17452/>.

Vo, Xuan V., (2005): "International financial integration and economic growth: a panel analysis", *The Business Review 3 (3).*

World Bank: World Development Indicators, various issues.

Appendix A5

The Cochrane-Orcutt and Prais-Winston regression

The Cochrane-Orcutt and Prais-Winston regression is a transformation procedure used to correct for the biases arising from the presence of serial correlation of the residuals. The first step is to conduct a standard linear regression of the equation:

$$y_t = \alpha_t + \beta_t x_t + \mu_t \quad \text{(A5.1a)}$$

where: y is the dependent variable, x is the independent variable, β is the coefficient explaining the effect of x on y, α is the intercept and μ is the residual term. The subscript: t denotes time period with t= 1, 2, ...T, where T is 35 years. In the second step of the Prais-Winston regression estimates the correlation in the residuals:

$$\mu_t = \rho\mu_{t-1} + e_t \quad \text{(A5.1b)}$$

In the next step, we apply a Cochrane-Orcutt transformation (A5.2a) for observations t=2, ...n

$$y_t - \rho y_{t-1} = \beta(x_t - \rho x_{t-1}) + \alpha(1-\rho) + v_t \quad \text{(A5.2a)}$$

and the Prais-Winsten transformation (A5.2b) for t=1

$$\sqrt{1-\rho^2 y_1} = \beta(\sqrt{1-\rho^2 x_1}) + \alpha\sqrt{1-\rho^2} + \sqrt{1-\rho^2 v_1} \quad \text{(A5.2b)}$$

The differences between the Cochrane-Orcutt and the Prais-Winsten techniques are that the second technique employs (A5.2b) in addition to (A5.2a), whilst the first technique employs only (A5.2a), essentially reducing the sample size by one. Equations A5.2a and A5.2b are employed to transform the data and obtain new estimates of β and α.

The process of iterating to convergence begins and is repeated until the change in the estimate of ρ is within an accepted boundary. The newly obtained estimates are employed to produce fitted values

$$\hat{y}_t = \beta\hat{x}_t + \hat{\alpha} \quad \text{(A5.3)}$$

and ρ is, in turn re-estimated with the type of regression

$$y_t - \hat{y}_t = \rho(y_{t-1} - \hat{y}_{t-1}) + e_t \quad \text{(A5.4)}$$

Equation A5.1a is then re-estimated by employing the newly estimated ρ and proceed with the iteration between (A5.1a) and (A5.1b) until a convergence of ρ is achieved.

Table A5.1: Stationarity test of series for South Africa

	Levels		Level of integration
Variables	ADF test	PP test	
Investment volatility	-3.72*** (I, 0)	-3.593** (I, 0)	I(0)
Foreign direct investment inflow (% of GDP)	-4.20*** (I, 0)	-4.24*** (I, 0)	I(0)
Foreign loans inflows (% of GDP)	-3.38** (I, 1)	-3.25** (I, 0)	I(0)
Portfolio equity investment inflows (% of GDP)	-2.72* (I, 0)	7.72* (I, 0)	I(0)
Domestic credit to private sector (% of GDP)	-4.62*** (I, 0)	-4.58*** (I, 0)	I(0)
Political climate (weighted conflict index)	-2.88* (I, 0)	-2.80* (I, 0)	I(0)
Political institution (Institutionalised democracy index)	-3.40** (I, 0)	-3.31** (I, 0)	I(0)
Inflation volatility	-4.15** (I, 0)	-4.11** (I, 0)	I(0)
Foreign capital inflow (% of GDP)	-3.33* (I, 0)	-3.31* (I, 0)	I(0)
Output growth (%)	-3.61** (I, 0)	-3.52** (I, 0)	I(0)

Table A5.2: OLS estimation of investment volatility in South Africa

Investment volatility	Coefficient	Standard error	t-statistic	P>|t|
1st order lag dependent	0.218	0.186	1.17	0.253
FDI inflow [one period lag]	-0.198	0.201	-0.98	0.335
Foreign loan [one period lag]	0.014	0.267	0.05	0.959
Portfolio investment inflow [one period lag]	-0.329	0.123	-2.68	0.014
Political institution (institutionalised democracy)	-0.010	0.010	-1.08	0.292
Political climate (weighted conflict index)	-0.155	0.090	-1.72	0.099
Domestic credit to private sector ratio [one period lag]	0.010	0.010	1.00	0.328
Domestic credit ratio volatility				
Inflation volatility [one period lag]	-0.034	0.072	-0.47	0.646
Output growth (%) [one period lag]	0.019	0.098	0.19	0.853
Constant	0.292	1.379	0.21	0.834
Durbin-Watson d-statistic:	2.479			
Breusch-Godfrey LM test: Chi^2	6.193			
$Prob>chi^2$	0.013			
Durbin's alternative test: Chi^2	5.039			
$Prob>chi^2$	0.025			
Adjusted R-squared	0.195			

CHAPTER SIX

FOREIGN CAPIAL FLOWS AND OUTPUT VOLATILITY IN SELECTED SUB-SAHARAN AFRICAN COUNTRIES

6.1 Introduction

The increase in cross-border financial flows among developed countries, and from the developed to developing countries over the past two decades, has been stimulated by the liberalisation of external capital accounts transactions in many countries (Kose et al., 2006). The expectations from the liberalization was that increased cross-border capital mobility would bring benefits such as more efficient global allocation of capital and improved international risk-sharing opportunities. In theory, the benefits from increased capital flows ought to be large for the capital-poor developing countries that tend to have more volatile income growth (Lane and Milesi-Ferretti, 2003; Vo, 2005a&b; Delechat et al., 2009). However, the rapid increase in capital flows has been followed by a series of currency and financial crises in the late 1980s, 1990s and 2000s, thereby posing a threat to global financial and economic stability (Reinhart and Rogoff, 2009). These developments have generated an intensive debate among both academics and policymakers on the costs and benefits of increased international capital mobility, especially in terms of its impact on the stability of economic growth.

Existing theories, including the models of Mendoza (1994) and Baxter and King (1999), propose that the relationship between financial integration and output growth volatility is ambiguous. Studies by Senay (1998), Buch et al. (2002), Prasad et al. (2003) and Kose (2002) also hypothesize that the relationship between financial integration and output growth volatility depends on the nature of shocks and country-specific characteristics. Empirical studies, including the work of Ahmed and Suardi (2009) and Easterly et al. (2001) also do not offer any clear evidence on the link between financial openness and output growth volatility. Although Ahmed and Suardi (2009) and Mougani (2012) have examined the impact of international capital flows on output growth volatility in Sub-Saharan Africa, their studies fail to analyse the impacts of types and composition of foreign capital flows on the dynamics of output growth volatility over

time. In addition, studies that examine the effect of output growth instability on the dynamics of international capital flows are yet to be identified.

This study seeks to test the hypothesis that international capital flows have a significant impact on the dynamics of domestic output growth volatility. It focuses on a panel data of selected Sub-Saharan African countries[17]. In addition, the study seeks to test the hypothesis that there is a bi-directional relationship between international capital flows and the stability of growth in output. The study contributes to knowledge in three ways. Firstly, the impacts of types and composition of international capital flows on the time dynamics of output growth volatility in a group of developing countries in Sub-Saharan Africa are examined. Secondly, the dynamic inter-relationships among types of international capital flows and output growth volatility within individual developing countries are explored, using a sample of countries in Sub-Saharan Africa. Finally, unlike Ahmed and Suardi (2009), our measure of output growth volatility is obtained from estimating the basic GARCH model for output growth, which provides a time-dependent measure of volatility.

The rest of the paper is organised as follows. The next section reviews literature that explains the relationship between output growth volatility and international capital flows. Section three reviews literature on other determinants of growth volatility. The hypotheses and estimated empirical model are presented in section four. Section five provides the sources and description of data used for the study. The estimation results for the relationship between output growth volatility and foreign capital flows (aggregated and disaggregated) are presented and discussed in section six. Finally, section seven summarises the findings of the research and concludes the discussion by indicating the basic limitation of the study and offering some directions for future extensions.

[17]The selected countries are South Africa, Nigeria, Botswana, Ghana, Kenya, Mauritius, Mozambique, Namibia, Zambia, Uganda, Tanzania, Seychelles, Cape Verde, Senegal, Zimbabwe and Angola. These countries have, to an extent, developed and deregulated their domestic financial markets and offered competitive investment environments to attract investments. Except for Angola and Mozambique, these countries have also reduced restrictions on external capital flows. One of the key objectives for these initiatives is the attraction of greater foreign capital flows (International Monetary Fund, 2008).

6.2 International capital flows and output growth volatility

The relationship between increased financial flows and macroeconomic volatility is found to be ambiguous in both theory and empirical studies. In theoretical literature, such as in Calderon and Schmidt-Hebbel (2008) and Prasad et al. (2003) the impact of higher financial integration, in the form of increased international capital flows, on output growth volatility is ambiguous. On the positive side, higher levels of financial integration give capital-deficient countries access to additional finance required for increased output growth and a more diversified production base. On the negative side, higher integration may lead to higher specialization in production based on comparative advantage, and thereby result in greater vulnerability to traded-industry specific shocks. In addition, Calderon and Schmidt-Hebbel show that countries with a high proportion of debt in total external financial liabilities tend to be highly susceptible to external financial shocks, with adverse consequences for the stability of output growth.

There is an increasing body of empirical studies on the relationship between international financial integration and output growth volatility. This includes studies by Ahmed and Suardi (2009) and Calderon and Schmidt-Hebbel (2008). However, these studies have generally failed to provide evidence of a clear link between integration and macroeconomic volatility. For instance, Ahmed and Suardi (2009) investigated the impact of financial and trade liberalization on output and consumption growth volatility, and found financial liberalization to reduce both output and consumption growth volatility in 25 selected African countries. On the other hand, Gavin and Hausmann (1996) and Denizer et al. (2002) provide evidence of a positive relationship between financial openness, proxied by capital flows and output volatility. Also, Easterly et al. (2001), Razin and Rose (1994) and Mendoza (1994) do not find any significant relationship between financial integration and macroeconomic volatility.

Empirical literature also provides evidence to confirm the hypothesis that the impact of foreign capital flows on output growth volatility depends on country characteristics. For instance, Ahmed and Suardi (2009) provided evidence that strong institutions and increased financial depth reinforce the stabilizing effect of financial openness on output growth in 25 selected African countries. Another related study by Calderon and Schmidt-Hebbel (2008) found evidence that output volatility increases in response to higher capital flows in developing

countries that have less diversified production structure and poor quality institutions. Also, by using data covering a sample of 24 countries, Buch et al. (2005) confirmed the hypothesis that financial integration increases output volatility in the presence of a monetary policy shock, but reduces volatility in the presence of a fiscal policy shock. In addition, Buch et al. (2002) found that countries with well-developed financial sectors are better able to reduce output volatility through financial integration.

Most empirical studies, including that of Ahmed and Suardi (2009), have either used the standard deviation of annual GDP growth over a rolling window, usually ranging from three- to-five year (non-overlapping or overlapping) averages or the standard deviation measure around a simple time trend. However, these measures have shortcomings. The basic limitation with use of this measure is that it entails loss of observations at the beginning of sample, as the computations provide an average value for the window's length. In addition, the dynamics of the output growth volatility strongly depend on previous periods' averages. This causes problems of endogeneity and serial correlation, which could lead to non-robust estimates. The calculation of output growth assigns equal weight to output growth in preceding periods and consequently provides an impracticable measure of persistence in volatility dynamics. As a result of that, growth volatility tends to be under-estimated in the years in which shocks occurred, and overestimated subsequently. Also, most of the studies fail to examine the different effects of different types of international capital flows on output growth volatility.

Unlike in previous studies, this study uses a time dependent measure of volatility obtained from estimating the basic GARCH model for output growth in the selected countries and examines the impact of types of capital flows on the time dynamics of the output growth volatility.

6.3 Determinants of output growth volatility

A number of country specific characteristics have been identified in previous empirical studies examining output growth volatility and these include domestic financial depth, openness to international trade, political environment and institution, fiscal policy and level of economic development. These are discussed in turn.

6.3.1 Domestic financial depth

According to Easterly et al. (2001) and Ahmed and Suardi (2009), one of the means by which economic agents diversify risk and smooth shocks to domestic production is to access credit from domestic financial markets. The availability of credit, in turn, depends on the depth of domestic financial markets. Increased domestic financial depth improves availability of credit for direct investments and provides investors with funds needed to meet their short and long term needs. In addition to its direct influence on aggregate volatility, domestic financial depth affects volatility through its intermediation of global resources inflows. Studies, including those of Calderon and Schmidt –Hebbel (2008), Easterly et al. (2001) and Kose et al. (2003), used three proxy measures for financial depth and identified deeper domestic financial markets to be associated with lower output growth volatility.

6.3.2 Openness to international commodities trade

According to Calderon and Schmidt-Hebbel (2008), increased international trade can help countries with more diversified exports and production structures to diversify away from trade-related specific shocks. Easterly et al. (2001), on the other hand, argue that increased openness to international trade may enhance output volatility in countries that specialize in producing and exporting few primary products, because these countries become more prone to traded-industry specific shocks.

Empirical studies, including those by Calderon and Schmidt-Hebbel (2008), Ahmed and Suardi (2009) and Kose et al. (2003) do not provide clear evidence of the relationship between external trade openness and output growth volatility. Kose et al. (2003) and Ahmed and Suardi (2009) identified trade openness as exacerbating macroeconomic instability whilst Calderon and Schmidt-Hebbel (2008) identified trade openness as reducing growth volatility.

6.3.3 Political environment and institution

Bekaert et al. (2006) and Kose et al. (2006) contend that the quality of government and institution has a significant impact on the promotion of economic growth and stability. A stable government and favourable political environment reduce country risks and costs of investment,

and consequently promotes economic (output and consumption) growth and stability. Political factors may play a central role in shaping the extent of shocks faced in an economy and in the establishment of an institutional framework that help smooth shocks. There is a possibility that governments only undertake effective reforms when such institutional framework is put in place. Johnson et al. (2000) provide evidence to support the assertion that developing countries that have weak institutions and are open to international capital flows tend to be prone to global shocks.

6.3.4 Fiscal policy

There is a wide array of literature that explains the relationship between fiscal policy and macroeconomic volatility. This includes the work of Persson (2001), Fatas and Mihov (2003), and Lane (2003), Kose et al. (2003) and Wolf (2004) which postulates that the relationship between fiscal policy and economic growth volatility is ambiguous. A large government sector could be an indication of large macroeconomic imbalances and countries that do not allow for a market-based allocation of capital for investments based on private market signals. The resultant inefficiencies in the allocation of investment capital could, in turn, lead to an exacerbation of output growth instability. A large government sector may also be a reflection of the existence of a large welfare state with refined policies to even out macroeconomic shocks, and consequently, lead to reduced growth instability. Ahmed et al. (2009) identified fiscal policy changes to be positively associated with income growth volatility. Kose et al. (2003) and Furceri (2007) also identified fiscal policy volatility as an important factor that accounts for increased macroeconomic instability.

6.3.5 Level of economic development

Economic size and the level of development of a country also have an influence on the stability of economic growth. Wolf (2004) argues that the more advanced economies with relatively more diversified production structures tend to be less prone to sector-specific shocks. Empirical studies, including Kose et al. (2003), however, failed to confirm a positive correlation between the level of economic development or size and macroeconomic volatility.

6.4 Methodology

6.4.1 Hypotheses

The following is our basic hypothesis drawn from a survey of theory and empirical literature: *increased international financial integration helps emerging and developing economies to better manage output growth volatility.* The validity of this hypothesis depends on country specific characteristics such as the structure of the country's external finance and the domestic financial depth of the capital-receiving country. The second working hypothesis drawn from theory and empirical studies including those of Dasgupta and Ratha (2000) and Hernandez et al. (2001) is as follows: *there is a bi-directional relationship between international capital flows and the volatility of economic growth in capital-receiving countries*. The general argument is that the achievement of macroeconomic stability reduces the risks and uncertainties associated with returns on investments, enhances profit prospects and attracts greater inflow of foreign investments.

6.4.2 Empirical Model

The estimated empirical model for output volatility used to test for the validity of the first working hypothesis follows the works of Fatas and Mihov (2003and 2005) and Prasad et al. (2003). The explanation of output growth volatility is based on three sets of variables: One referring to the ability of agents to diversify risk portfolio (as a result international risk sharing opportunities) and to smooth shocks; the second set refers to fiscal policy and its volatility; the third set captures the effect of level of economic development on output volatility.

A formalized version of the output volatility model to be estimated is presented following:

$$\sigma_{i,t}^{Q} = a_0 + a_1\sigma_{i,t-1}^{Q} + b_1 feiq_{i,t-1} + b_2 nfeiq_{i,t-1} + b_3 debt_{i,t-1} + b_4 TO_{i,t} + b_5 POL_{i,t} + b_6 G_{i,t} + b_7 dc_{i,t-1} + e_{i,t} \quad (6.1a)$$

$$\sigma_{i,t}^{Q} = a_0 + a_1\sigma_{i,t-1}^{Q} + \beta_1 fkiq_{i,t-1} + \beta_2 debt_{i,t-1} + \beta_3 TO_{i,t} + \beta_4 POL_{i,t} + \beta_5 G_{i,t} + \beta_6 dc_{i,t-1} + \beta_8 demd_{i,t} + e_{i,t} \quad (6.1b)$$

$$\sigma_{i,t}^{Q} = a_0 + a_1\sigma_{i,t-1}^{Q} + c_1 fkiq_{i,t-1} + c_2 debt_{i,t-1} + c_3 TO_{i,t} + c_4 POL_{i,t} + c_5 G_{i,t} + c_6 dc_{i,t-1} + c_7 demd_{i,t} + b_9 fk * demd_{i,t-1} + e_{i,t} \quad (6.1c)$$

Definitions for the notations in the equation are provided below. The notations $\sigma_{i,t}^{Q}$ = domestic output growth volatility; $\sigma_{i,t-1}^{Q}$= one-period lag output growth volatility; $feiq_{i,t-1}$= one-period lag foreign equity flows as ratio of GDP; $nfeiq_{i,t-1}$= one-period lag foreign non-equity flows as ratio of GDP; $debt_{i,t-1}$= share of external debt in total foreign capital flows, used as a measure of the composition of capital flows; $TO_{i,t}$ is the measure of openness to external trade which is calculated as a ratio of the sum of exports and imports to GDP; $POL_{i,t}$ represents political climate measured by the weighted conflict index; $G_{i,t}$ denotes fiscal policy measured by government expenditure as ratio of GDP; $dc_{i,t}$ is domestic credit to private sector as ratio of GDP which measures domestic financial depth and depicts domestic financial sector development; and $demd$ is a dummy variable for the period of democracy. The expected signs of the coefficient parameters are as follows: a_1, c_2 β_2, b_3 and β_8 are indeterminate; c_4, β_4 and $b_5 > 0$; b_1, β_1, c_1, b_2, β_3, c_3, b_4, β_5, c_5, b_6, β_6, c_6, b_7 and $\beta_9 < 0$.

The notation: $fk * demd_{i,t-1}$ is a one-period lagged interaction term, representing the interaction between foreign capital flows and political institution. Both theory and empirical literature including those by Calderon and Schmidt-Hebbel (2008) and Ahmed and Suardi (2009) suggest that country-specific characteristics such as the political system or institution have significant influence on the relationship between foreign capital flows and output growth volatility in developing countries. . Similarly, the subscript i = 1, 2,…….N cross-sections, and periods t = 1,2,…..T, with 'N' number of countries and T= 35 years, spanning the sample period 1975-2009. The notation a_0 is the intercept..

Estimation of the dynamic panel model involved the use of the system-generalised method of moments (GMM) estimator.[18] This corrects for potential endogeneity biases that may arise from

[18] The weakness with the application of this kind of estimation approach to a dynamic panel data model with a large time series and a comparatively small cross-section of countries is the possible existence of a

the inclusion of the lagged dependent variable and some explanatory variables in the equation. In addition, the system-GMM estimator enhances the precision and efficiency of the estimates (see Appendix A8 for detailed notes on justification).

In this study, we also tested for the validity of the second working hypothesis by using a time series econometric model to investigate the dynamic inter-relationships between types of international capital flows and output growth volatility in the selected countries. We first investigated the time series properties of the variables by use of the augmented Dickey-Fuller (ADF) and Phillips-Perron unit root tests. The unit root tests indicate that all the times series are stationary in levels (see Table A6.1). Consequently, we proceeded with the regression analysis by estimating a vector autoregressive (VAR) model to examine the multi-directional causal relationship between types of international capital flows and output growth volatility in the 16 selected countries.

A formal presentation of the unrestricted VAR model is as follows:

$$B(L)X_t = U_t,$$

where t = 1, 2, ..., n (6.2a)

The notation L denotes lagged values. The notation U represents innovations for X, which are assumed to be normally distributed. The B matrix can now be inverted and each of the endogenous variables can be expressed in terms of its own innovations and the lagged values of the innovations of all the other series. This can be shown as follows:

$$X_t = [B(L)]^{-1}U_t \quad (6.2b)$$

Equation 6.2a can be expanded and presented as follows:

$$X_t = a + b_1X_{t-1} + \ldots\ldots + b_kX_{t-k} + V_t,$$

where t = 1, 2, ...n, (6.2c)

high time series bias in the data construct. Data constraints did not permit a wider coverage, in terms of the cross-section of countries covered.

The notation X_t denotes integrated series of order zero *I(0)* and *k* stands for the lag length of the series. The series used for the time series regression analysis are international equity and non-equity flows, expressed as share of GDP, and output growth volatility measures obtained from estimating a basic GARCH model for output growth.

In theory, economic growth in advanced countries (wqg) has a significant influence on the stability of growth in domestic output of developing countries that are open to international commodities trade and international investments. Consequently, we include GDP growth of advanced economies in the equations 6.2a to 6.2c as an exogenously determined explanatory variable to enable us capture its effect on the endogenous variables.

6.5 Data and variable definition

Annual data covering sixteen emerging and frontier market economies in Sub-Saharan Africa were collected for the study, using a dynamic panel regression analysis. These economies have gone ahead to implement reform measures to liberalise their external capital account transactions and develop their domestic financial markets.[19]

With the exception of the weighted conflict index, data on all the variables were obtained from the World Bank's World Development Indicators 2010. Data on the weighted conflict index for the political environment were obtained from the Databanks International. The study period is from 1975 to 2009.

6.5.1 Output volatility

Most of empirical studies have used the standard deviation of annual output over a rolling window; say three- to-five year rolling averages. A large number of alternative measures have also been based on the standard deviation measure around a simple time trend. However, these measures have shortcomings. One of the limitations with the use of this measure is that it entails loss of observations at the beginning of sample, as the computations provide an average value for

[19] See paragraph 2, section 2.5 in Chapter Two of the thesis for details on the definition of emerging and frontier market economies.

the window's length. Another limitation is that volatility measures such as standard deviation and the coefficient of variation are deemed to overemphasize variability in non-trending series. The squaring of the values of these volatility measures also has a tendency to worsen the problem of outliers (Canova, 1998; Offut and Blandford, 1986). Nelson (1992) identifies the simple ARCH and related models as the most appropriate for assessing changes in volatility over time.

To account for the time dynamics of volatility, we estimate volatility by using the following GARCH (1, 1) model:

$$Q_t = Q_{t-k}\rho + \varepsilon_t \quad (6.3)$$

$$\sigma_t^2 = \mu + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 \quad (6.4)$$

where Q_t is output growth, Q_{t-k} is the k-period lagged value of output growth. The notation σ_t^2 is the variance of the disturbance term from the mean equation (equation 6.1); μ is the mean; $\varepsilon_{t-1}^2$is the one-period lag of the squared residual from the mean equation which indicates news about volatility from the previous period; and σ_{t-1}^2 is last period's forecast variance. The (1, 1) in the GARCH (1, 1) indicates the presence of a first-order GARCH term and a first-order ARCH term.

The model was estimated for individual countries. The advantage of individual country regressions is that it allows heterogeneity in the estimated coefficients. The sum of the coefficients, α_1+β_1, is a measure of volatility persistence. For a well-specified variance function, the sum of the coefficients must be less than 1. We also included a dummy for the period in which external financial liberalisation was carried out to capture changes in volatility during the period of liberalisation. The value '1' is assigned for the period of liberalisation and '0' otherwise.

6.5.2 Foreign capital flows

International financial integration is measured by the ratio of aggregate and disaggregated foreign capital flows to GDP. It is hypothesized in literature, including Kose et al. (2003), that the relationship between international financial integration and output growth volatility is

ambiguous and depends on country-specific characteristics such as the level of institutional development. To capture the influence of country-specific characteristics on the relationship between international capital flows and output growth volatility, we introduced an interaction term for capital flows as share of GDP and institutionalised democracy in the estimation model.

6.5.3 Determinants of output growth volatility

Potential determinants of output growth volatility that have been identified in literature and used as control variables in our analysis of the output growth volatility in the selected countries are domestic financial depth, trade openness, political climate and institution and fiscal policy. Their respective measurements are presented in turn.

The depth of domestic financial markets is measured as the ratio domestic credit to private sector as share of GDP. Increased domestic financial depth improves availability of credit for direct investments and provides investors with funds needed to meet their short and long-term needs. Openness to international commodities trade is measured using ratio of total external trade to GDP. Calderon and Schmidt-Hebbel (2008) suggest that the relationship between external trade openness and output growth volatility is ambiguous. As a proxy for political climate, we employed the weighted conflict index as proxy for political climate. Data on the weighted conflict index were obtained from the Data-Banks International. The values of the index are re-scaled to the nearest 1000 unit. The outcome of this approach is a range of values for the index that begins with '0' and ends at 10.437. The value '0' indicates no conflict (a highly stable political climate) and values greater than '0' indicate the existence of some form of political instability or conflict. Higher values indicate higher levels of conflict or political instability.[20] It is hypothesized by Bakaert et al. (2006) and Kose et al. (2006) that political instability exacerbates macroeconomic volatility. The binary indicator is employed as proxy for political regime shift or change in type of political institution. The value '0'indicates a period of autocratic regime and the value '1' indicates a period of democratic regime. Based on a review of the existing literature, including North (1990), our working hypothesis is that output growth

[20] See sub-section 2.3.3 in Chapter 2 and sub-section 4.4.1 in Chapter 4 of the thesis for detailed explanation. Also, see Appendix A2.1.

volatility reduces during periods of democracy, but increases during periods of autocracy. The underlying theory is that whilst democratic institutions contributes positively to the stability by creating incentives for the attraction of higher rates of investments, autocratic institutions may exacerbate output growth instability by discouraging investments.

The role of fiscal policy is captured using size of government measured by the ratio of government expenditure to GDP and its volatility. The incorporation of government size helps to control for the stabilizing role of fiscal policy as argued by Gali (1994) and Fatas and Mihov (2001). We construct a fiscal policy volatility indicator that is not influenced by the business cycle and indicates discretionary policy changes by estimating the following function using the GARCH (1. 1) model:

$$\Delta E_t = \alpha_i + \beta_i \Delta Y_t + \gamma_i \Delta E_{t-1} + \theta_i P_t + v_t \quad (6.5)$$

$$h_t^2 = w + c_1 \varepsilon_{t-1}^2 + d_1 h_{t-1}^2 \quad (6.6)$$

where:

-ΔE is the rate of growth in government spending

- ΔY is output growth in current period

- $P$is vector of control variables, including inflation.

- h_t^2 is the error variance;

- w is the mean;

- $\varepsilon_{t-1}^2$is the one-period lag of the squared residual from the mean equation which indicates news about volatility from the previous period; and

- h_{t-1}^2 is last period's forecast variance.

Following Fatas and Mihov (2003), we defined discretionary fiscal policy volatility as the residual series obtained from estimating the variance equation. The model was estimated for individual countries to allow for heterogeneity in the estimated coefficients. It is hypothesized in the literature, including Kose et al. (2003) and Furceri (2007) that fiscal policy can be used as a tool for the achievement of a stable output growth.

6.6 Estimation Results

The first stage of the estimation employs the GARCH (1. 1) model to estimate volatility measures for output growth. The GARCH (1, 1) was fitted for each of the 16 selected countries to determine the suitability of the model as a good descriptor of the volatility of output and government expenditure. We present the results from estimating the variance equation for total output in Table 6.1.

The estimated coefficients of the variance equation for 15 out of 16 countries were found to be significant at least at the 10% level. All the 15 countries exhibited high coefficient estimates. Countries that have the least estimated coefficients are Cape Verde, South Africa and Angola, whilst the other countries have comparatively high estimated coefficients.

Table 6.1: Estimation of the GARCH (1, 1) model for output growth

	Constant	ARCH (1) (α_1)	GARCH (1) (β_1)	External financial liberalization index	Log-Likelihood
Botswana	-0.242	0.693**	0.259**	1.622**	345.57
Cape Verde	0.669*	-0.101	0.870***	0.037	317.21
Ghana	-1.105	0.742***	0.167*	-2.804**	261.15
Kenya	-0.155	0.640**	0.149	0.678	304.81
Mauritius	1.438***	0.727***	0.207*	-2.678**	326.59
Mozambique	0.588	0.860***	0.091**	--	363.15
Namibia	-0.693	0.857***	0.070*	0.462	301.96
Nigeria	-1.660**	0.776***	0.135**	-4.019	368.31
Seychelles	1.453***	1.044***	-0.068**	1.458***	430.62
South Africa	0.145	0.777***	-0.007	0.195	286.56
Tanzania	0.301	0.917***	0.156*	-3.668**	276.24
Uganda	2.823**	0.904**	0.050	-4.573**	194.16
Zambia	-0.235	0.718***	0.203***	-1.980	339.83
Senegal	-0.428	-0.089	1.071***	-0.466	91.379
Zimbabwe	4.432	-0.294**	1.176***	6.340***	105.89
Angola	3.125	0.621	-0.150	5.162	77.159

Notes: *, **, *** *denote significance at 10%, 5% and 1% level of significance.*

The estimated results also indicate that Botswana, Seychelles and Zimbabwe have experienced significantly higher levels of instability in their output growth during the period of external

financial liberalisation, whilst Ghana, Mauritius, Tanzania and Uganda have been successful in reducing output growth instability significantly during the liberalisation period.

Agenor et al. (2000) and Canova (1998) show that the size of the summed-up value of the ARCH and GARCH terms in the variance equation is a measure of persistence in volatility shocks. When the summed-up value of the coefficients of ARCH and GARCH terms is equal to unity, the suggestion is that volatility shocks die out slowly; hence lower values of the summed-up terms indicate that volatility shocks die out much faster.

Table 6.2: Volatility persistence in output growth

	Volatility Persistence, ($\tau = \alpha_1 + \beta_1$)
Botswana	0.952
Cape Verde	0.769
Ghana	0.909
Kenya	0.789
Mauritius	0.934
Mozambique	0.951
Namibia	0.927
Nigeria	0.911
Seychelles	0.976
South Africa	0.770
Tanzania	1.073
Uganda	0.954
Zambia	0.921
Senegal	0.982
Zimbabwe	0.882
Angola	0.471

In 15 out of the 16 selected countries, the persistence measures were at least close to unity; indicating the presence of an integrated GARCH phenomenon and underlining persistent changes in the volatility of total output growth. Whilst output volatility persistence was highest in Botswana, Ghana, Mauritius, Mozambique, Namibia, Nigeria, Seychelles, Tanzania, Uganda, Zambia and Zimbabwe, the level of output volatility persistence was least in Cape Verde, South Africa, Kenya and Angola.

6.6.1 Output growth volatility

The second stage of the regression involved the estimation of the impact of external capital flows on output growth volatility. Findings from the estimation results are presented in Table 6.3. The diagnostic tests for the dynamic model specification in both instances indicate that the model is well specified. The new residuals for the specifications are, at times, auto-correlated of order 1, but not auto-correlated of order 2. The Sargan test results also confirm the validity of the over-identifying restrictions and use of the instruments.

The results indicate that international equity flows, total foreign capital flows, the share of debt in external financial liabilities, international commodities trade openness, political climate, domestic financial depth, type of political institution and the interaction term for international capital flows and political regime dummy are important determinants of domestic output growth volatility in the selected countries. The estimation results reveal statistically significant and negatively signed coefficients for the first order lag dependent variable, one-period lagged values for foreign equity flows, the share of debt in external financial liabilities, external trade openness, domestic financial depth and the interaction term for international capital flows and the political regime dummy, but positively signed coefficients for total foreign capital flows and political climate.

The estimated coefficient value for equity flows is statistically significant and negatively signed. This suggests that an increase in the level of foreign equity flows reduces instability in the growth of domestic output in the emerging and frontier market economies in Sub-Saharan Africa. The estimated coefficient value for the share of debt in total external financial liabilities is also statistically significant and negatively signed. This indicates that an increase in the share of debt in total external financial liabilities reduces instability in the growth of domestic output in the selected countries. The ability of external debt inflows to reduce output growth instability is likely due to the continued dominance of long-term debt in the total external debt liabilities of the selected countries, which reduces their susceptibility to shocks emanating from capital flow reversals. The World Bank's World Development Indicators 2010 show that long-term debt

constitutes an average of over 75 per cent of total external debt inflows to the emerging and frontier market economies in Sub-Saharan Africa.

The results from the estimation also indicate that the coefficient value for total foreign capital flow is statistically significant and positively signed, and suggest that increased capital flows exacerbate output growth instability. Similarly, the coefficients for political climate and the political regime dummy are statistically significant and positively signed. This implies that political instability exacerbates output growth instability in the selected countries. The period of democracy has also been characterised by an increase in output growth volatility. The interaction term for international capital flows and the political regime dummy has a negative and a statistically significant coefficient. This suggests that increases in international capital flow reduce instability in growth of output when democratic institutions are established. The results also imply that international capital inflow has conditional and unconditional effects on the stability of output growth in the SSA emerging and frontier market economies.

Table 6.3: System dynamic panel regression for output growth volatility

	Equation 6.1a	Equation 6.1b	Equation 6.1c
1st order lagged dependent	-0.263** (-1.97)	-0.194** (-2.01)	-0.026 (-0.15)
Foreign equity flows (% of GDP) (one-period lag) [*feiq_1*]	-0.091*** (-3.01)		
Foreign non-equity capital flows (% of GDP) (one-period lag) *nfeiq_1*]	-0.019 (-1.25)		
Foreign capital inflows (% of GDP) (one-period lag) [*fkiq_1*]		0.031** (2.20)	0.021** (2.20)
Share of external debt in total foreign capital flows (one-period lag) [*debt_1*]	-0.016* (-1.81)	-0.013** (-2.08)	0.001 (0.04)
External trade openness [*TO*]	-1.898* (-1.83)	-1.890 (-1.80)	-2.938** (-2.33) (1.28)
Political climate (weighted conflict index) [*POL*]	0.096* (1.78)	0.122* (1.89)	0.402*** (2.90)
Fiscal policy [*G*]	-0.019 (-1.18)	-0.013 (-0.91)	0.013 (1.59)
Domestic credit to private sector as share of total GDP [*dc*]	-0.077* (-1.74)	-0.032 (-2.11)	-0.032** (-2.11)
Political regime dummy (period of democracy) [*demd*]		1.112 (0.37)	1.234** (1.99)
Interactive term I (foreign capital × democratic era) (one period lag) [*fk*demd_1*]			-0.270 (-2.12)
Constant	-1.065 (-1.46)	1.640 (1.48)	1.711 (2.38)
Sargan test	1.00	1.00	1.00
Serial correlation test (1st order)	0.011	0.121	0.804
Serial correlation test (2nd order)	0.379	0.582	0.711
Number of cross-sections used	16	16	16
No. of Observation	470	474	474

*Note: All regressions include time effects, not reported here. The t-statistics are in parentheses. ***, **, and * indicate significance at 1, 5 and 10% respectively.*

A rise in the inflow of international capital leads to an unstable output growth pattern, but reduces instability in growth of output when democratic institutions are established in the selected countries. Hence, there is an opportunity for the existence a democratic system of governance to enhance the abilities of international capital inflows to reduce instability in growth of domestic output in the selected countries. The results compare favourably with those obtained by Ahmed and Suardi (2009) and Calderon and Schmidt-Hebbel (2008) in their studies for 25

Sub-Saharan African countries and 82 developing and industrial economies respectively. The results also provide evidence to support the proposition that increased external trade openness and increased domestic financial depth contribute significantly to a reduction in output growth instability. The coefficients for non-equity flows and fiscal policy were not found to be statistically significant in explaining output growth instability in the selected countries.

The results from estimating the vector auto-regression (VAR) model for the selected countries are presented in Tables 6.4a, 6.4b and 6.4c. The lag order selection criteria were used to determine the appropriate lag lengths for estimating the VAR model. These include the sequential modified LR test statistic, the Final Prediction Error and the Akaike Information Criterion. The results from estimating the accepted VAR model indicate that international equity flows have a significant influence on output growth volatility in five out of the 16 selected countries, whilst external debt inflows affect output growth volatility in only one country. International equity flows exacerbate instability in growth of output in Nigeria, Namibia and Zambia, but reduces growth instability in South Africa and Tanzania. External debt inflows also exacerbate output growth volatility in Nigeria. The results could mean that the rise in international equity flows is often accompanied by financial instability, which in turn, adversely affects the stability of growth in domestic output in Nigeria, Namibia and Zambia. South Africa and Tanzania have benefitted significantly from international equity inflows which contribute positively to the financing of investments in domestic production. The contribution of foreign debt to output growth instability in Nigeria could be explained by the high levels of volatility associated with short-term foreign debt flows which are easily reversed during crises.

Consistent with the results from estimating the panel data model, output growth instability in the previous periods had a significant impact on instability in the growth of domestic output in the current period in 6 out of the 16 selected countries. The sign of the coefficient is negative in 5 selected countries; namely Cape Verde, Namibia, South Africa, Senegal and Zambia, but is positive in one country; namely Nigeria. The results could be interpreted to mean that instability in the growth of domestic output in one period is followed by a more stable growth in domestic output in the subsequent period. This suggests that five out of the 16 selected countries have strong coping abilities to deal with shocks to growth in their domestic output. Economic growth

in these countries has become increasingly more stable overtime in Cape Verde, Namibia, South Africa, Senegal and Zambia, probably due to their good macroeconomic policies and institutions and the development of economies that have become less prone to external shocks overtime.

Table 6.4a: Vector auto-regression (VAR) model

Country	**Dep. Var.**	$\sigma^{Q}_{\_1}$	*feiq_1*	*fdebtq_1*	*Wqg*	*a*
Botswana	σ^{Q}	-0.096 (-0.48)	-0.019 (-0.44)	0.118 (1.28)	0.090 (0.65)	-0.325 (-0.61)
	feiq	0.394 (0.57)	0.605 (4.02)	-0.074 (-0.23)	0.682 (1.40)	-0.642 (-0.34)
	fdebtq	-0.062 (-0.15)	0.086 (0.96)	0.496** (2.58)	-0.441 (-1.51)	1.789* (1.60)
Cape Verde	σ^{Q}	-0.432* (-1.95)	-0.093 (-0.39)	-0.032 (-0.39)	0.051 (0.23)	0.456 (0.49)
	feiq	0.732 (0.59)	0.819 (-1.56)	0.393* (1.82)	-0.043 (-0.07)	-0.122 (-0.05)
	fdebtq	0.345 (0.57)	-0.095 (-0.58)	-0.011 (-0.05)	-0.745 (-1.20)	6.209** (2.43)
Ghana	σ^{Q}	-0.277 (-1.57)	0.069 (0.52)	-0.050 (-0.70)	-0.194 (-1.53)	1.100* (1.82)
	feiq	-0.218 (-1.20)	0.904*** (6.76)	-0.071 (-0.96)	-0.119 (-0.91)	1.064* (1.71)
	fdebtq	0.152 (0.34)	-0.179 (-0.54)	0.034 (1.22)	-0.179 (-0.55)	4.76* (3.09)
Kenya	σ^{Q}	-0.257 (-1.39)	-0.231 (-0.80)	0.010 (0.21)	0.344** (2.57)	-0.542 (0.47)
	feiq	-0.003 (-0.02)	-0.122 (-0.62)	0.012 (0.36)	0.047 (0.52)	0.484 (0.32)
	fdebtq	0.761 (1.23)	-1.820* (-1.88)	0.604*** (3.83)	0.203 (0.45)	0.940 (0.60)
Mauritius	σ^{Q}	-0.314 (-1.59)	-0.134 (-0.78)	-0.022 (-0.38)	-0.099 (-0.63)	0.896 (1.33)
	feiq	-0.294 (-1.04)	0.447* (1.81)	-0.048 (-0.57)	-0.031 (-0.14)	1.069 (1.11)
	fdebtq	-0.058 (-0.11)	0.157 (0.33)	0.681*** (4.24)	0.314 (0.73)	-0.827 (-0.45)
Mozambique	σ^{Q}	-0.457 (-2.53)	0.069 (0.69)	-0.006 (-0.16)	-0.073 (-0.50)	0.856 (1.78)
	feiq	-0.028 (-0.08)	-0.070 (-0.37)	0.050 (0.72)	-0.684 (-2.50)	2.132 (2.33)
	fdebtq	-0.776 (-0.86)	-0.316 (-0.64)	0.016 (0.09)	1.801*** (2.51)	1.092 (0.45)

Note: T-statistics are in parentheses.

Table 6.4b: Vector auto-regression (VAR) model

Country	**Dep. Var.**	$\sigma^{Q}_{\_1}$	*feiq_1*	*fdebtq_1*	*Wqg*	*a*
Seychelles	σ^{Q}	-0.165 (-0.94)	-0.016 (-0.41)	-0.010 (-1.58)	0.126 (0.92)	0.066 (010)
	feiq	-0.730 (-1.37)	1.117*** (9.426)	0.013 (1.07)	-0.784* (-1.88)	2.653 (1.28)
	fdebtq	-3.809 (-0.45)	1.168 (0.63)	0.119 (0.61)	-1.302 (-0.20)	-6.360 (-0.20)
Senegal	σ^{Q}	-0.533*** (-3.13)	0.127 (0.73)	-0.007 (-0.14)	-0.042 (-0.31)	0.523 (0.84)
	feiq	-0.048 (-0.25)	0.229 (1.16)	-0.056 (-0.98)	-0.065 (-0.42)	1.170* (1.67)
	fdebtq	-0.681 (-1.33)	-0.578 (-1.10)	0.477*** (3.10)	0.579 (1.43)	4.728 (2.52)
Zimbabwe	σ^{Q}	-0.001 (-0.01)	-0.076 (-0.51)	0.016 (0.34)	-0.001 (-0.01)	0.153 (0.30)
	feiq	-0.085 (-0.34)	0.347* (1.80)	0.034 (0.57)	-0.136 (-0.79)	0.833 (1.26)
	fdebtq	1.642*** (2.09)	-0.315 (-0.52)	0.336* (1.79)	-0.324 (-0.60)	1.837 (0.89)
Angola	σ^{Q}	-0.019 (-0.37)	-0.005 (-0.17)	-0.057 (-1.26)	0.180 (0.83)	-0.424 (-0.62)
	feiq	1.010 (0.42)	0.369 (1.26)	-0.264 (-0.84)	-1.534 (-0.75)	10.579 (1.60)
	fdebtq	-1.111 (-0.72)	-0.182 (-0.97)	0.249 (0.89)	1.119 (0.83)	-0.615 (-0.14)

Note: T-statistics are in parentheses.

Table 6.4c: Vector auto-regression (VAR) model

Country	Dep. Var.	σ^{Q}_{-1}	σ^{Q}_{-2}	σ^{Q}_{-3}	*feiq_1*	*feiq_2*	*feiq_3*	*fdebtq_1*	*fdebtq_2*	*fdebtq_3*	*wqg*	*a*
Namibia	σ^{Q}	-0.799*** (-4.36)	-0.351* (-1.85)		0.003 (0.68)	0.023** (2.19)						
	feiq	-0.494 (-0.53)	-0.137 (-0.15)		0.325 (1.24)	0.010 (0.02)						
Tanzania	σ^{Q}	0.053 (0.16)	-0.123 (-0.31)	-0.666 (-1.21)	0.065 (0.29)	0.283 (1.48)	-0.382* (-1.88)	0.219 (0.74)	-0.122 (-0.80)	-0.146 (-0.94)	0.403 (1.06)	-0.985 (-0.50)
	feiq	-0.367 (-0.73)	-0.945 (-1.58)	-0.134 (-0.16)	-0.176 (-0.53)	0.270 (0.94)	0.399 (1.31)	-0.302 (-0.69)	0.081 (0.36)	0.082 (0.35)	0.749 (1.32)	-0.018 (1.32)
	fdebtq	-0.242 (-0.69)	1.197** (2.85)	0.783 (1.36)	0.076 (0.32)	-0.017 (-0.08)	-0.055 (-0.26)	0.025 (0.08)	0.122 (0.76)	-0.177 (-1.08)	-0.851** (-2.13)	5.397** (2.62)
Zambia	σ^{Q}	-0.648*** (-3.47)	-0.528** (-2.74)	-0.291* (-1.69)	0.101* (1.60)	0.072 (1.25)	0.245*** (3.91)	0.023 (1.36)	0.063 (3.39)	0.018 (0.96)	-0.143 (-1.35)	-0.741 (-1.57)
	feiq	0.774 (1.14)	1.746** (2.49)	0.494 (0.79)	0.085 (0.37)	-0.217 (-1.04)	0.546** (2.39)	-0.029 (-0.47)	-0.052 (-0.77)	-0.051 (-0.76)	0.545 (1.41)	0.608 (0.35)
	fdebtq	0.677 (0.28)	-1.328 (-0.54)	0.126 (0.06)	-0.790 (-0.98)	0.291 (0.40)	-1.050 (-1.31)	0.042 (0.20)	-0.097 (-0.04)	-0.260 (-1.11)	-0.041 (-0.03)	1.278** (2.12)

Note: T-statistics are in parentheses.

Table 6.4d: Vector auto-regression (VAR) model

C'try	Dep. Var.	σ^{Q}_{-1}	σ^{Q}_{-2}	σ^{Q}_{-3}	*Δfeiq_1*	*Δfeiq_2*	*Δfeiq_3*	*fdebtq_1*	*fdebtq_2*	*fdebtq_3*	*wqg*	*a*
Nigeria	σ^{Q}	-0.080 (-0.36)	-0.177 (-0.97)	0.407** (2.05)	0.224** (2.20)	0.087 (0.83)	0.196 (2.09)	-0.010 (-0.16)	0.059 (1.28)	-0.077* (-1.81)	0.112 (0.86)	-0.081 (-0.18)
	Δfeiq	0.407 (0.84)	0.069 (0.17)	-0.197 (-0.45)	-0.564** (-2.51)	-0.408* (-1.77)	-0.464 (-2.24)	0.121 (1.15)	0.056 (0.55)	-0.075 (-0.79)	-0.104 (-0.36)	0.409 (0.41)
	fdebtq	-0.269 (-0.25)	-1.264 (-1.41)	-0.458 (-0.47)	-0.085 (-0.17)	-0.236 (-0.46)	-0.665 (-1.44)	0.435* (1.85)	-0.189 (-0.83)	0.414 (1.98)	0.129 (0.20)	0.380 (0.17)
South Africa	σ^{Q}	-0.251 (-1.30)	-0.383** (-2.20)	-0.540** (-2.62)	-0.020 (-0.18)	-0.313** (-2.82)	-0.324** (-2.60)	0.429 (1.57)	0.107 (0.29)	0.583 (1.50)	0.038 (0.30)	-0.120 (-0.27)
	Δfeiq	-0.582* (-1.67)	0.940** (2.99)	0.059 (0.16)	-0.176 (-0.85)	-0.010 (-0.04)	-0.527** (-2.35)	0.450 (0.92)	-0.425 (-0.63)	0.894 (1.28)	0.056 (0.24)	-0.147 (-0.18)
	fdebtq	-0.133 (-0.86)	0.176 (1.27)	-0.188 (-1.15)	0.094 (1.02)	0.038 (0.43)	-0.197* (-1.98)	0.965*** (4.43)	-0.424 (-1.43)	0.089 (0.29)	0.005 (0.01)	0.133 (0.37)
Uganda	σ^{Q}	-0.351 (-0.93)	-0.292 (-0.74)	0.105 (0.29)	-0.138 (-0.34)	0.559 (1.40)	-0.810 (-1.27)	-0.064 (-0.35)	-0.050 (-0.28)	0.179 (0.89)	-0.399 (-1.15)	1.828 (1.56)
	Δfeiq	0.179 (0.56)	-0.176 (-0.05)	-0.042 (-0.14)	0.035 (0.10)	-0.614* (-1.82)	-0.432 (-0.80)	0.022 (0.14)	-0.205 (-1.35)	0.290* (1.71)	-0.149 (-0.51)	0.585 (0.59)
	fdebtq	-0.306 (-0.53)	0.362 (0.60)	-1.164** (-2.05)	0.114 (0.18)	-0.773 (-1.25)	0.140 (0.14)	0.472* (1.65)	0.244 (0.88)	-0.019 (-0.06)	-0.814 (-1.52)	1.941* (1.88)

Note: T-statistics are in parentheses. The notation Δ denotes change.

The results also indicate that output growth instability affects foreign equity and debt inflows in South Africa, Zambia, Tanzania and Uganda. In South Africa, output growth instability is correlated with a rise in foreign equity flows. The results could be influenced by the large size of the domestic market which accounts for the large inflows of FDI and portfolio equity. Despite the unstable growth in domestic output, the size of the domestic market remains large and attracts market-seeking FDI. In Zambia, the positive correlation between output growth instability and foreign equity inflow could be explained by natural resource availability. In spite of the unstable growth in output, foreign direct investors are attracted by the intense availability of natural resources in Zambia. In Uganda, unstable growth in output accounts for a reduction in foreign debt capital inflow. This suggests that output growth instability implies an unstable and unattractive investment environment in Uganda. In Tanzania, unstable output growth is correlated with an increase in foreign debt capital inflows. This could be explained by foreign direct investors' decision to take advantage of other opportunities including the stable political environment and the fact that the FDI reflects other factors including the stable political environment in Tanzania. The results could also be influenced by a possible existing positive correlation between increased growth volatility and the acceleration of economic growth.

Lastly, the coefficient for GDP growth in advanced countries is statistically significant in the VAR model for Kenya, Mozambique, Seychelles and Tanzania. In Kenya, the coefficient for GDP growth in advanced countries is positively signed in the specification for domestic output growth volatility, suggesting that Kenya might be exposed to global output shocks. In Mozambique, the coefficient is positively signed in the specification for international debt-capital flows, and could be influenced by the growing interest of investors from the world's leading emerging economies including China and India. In Seychelles and Tanzania the coefficient is negatively signed in the specifications for international equity and debt-capital flows respectively, suggesting that economic recession in the advanced countries makes profit opportunities and returns on investments higher in Seychelles and Tanzania.

6.7 Conclusions and Recommendations

This study examined the impact of international capital flows on output growth volatility in emerging and frontier market economies in Sub-Saharan Africa. The study employed the dynamic panel (GMM-IV) estimation strategy and the dynamic time series (VAR) regression analysis.

Overall, the study finds evidence to support the proposition that increased international capital inflows help emerging and developing economies to reduce instability in growth of their domestic output. This applies to foreign equity inflows. The findings compare favourably with the results obtained by Ahmed and Suardi (2009) which indicate that financial liberalisation reduces output and consumption growth volatility in 25 selected African countries. Our findings however indicate that aggregate foreign capital inflow exacerbates output growth instability, but reduces it when democratic institutions are established in the selected countries. The establishment of democratic institutions enhances the ability of foreign capital inflows to reduce instability in growth of output in the SSA emerging and frontier market economies. Furthermore, increased openness to international commodities trade and increased domestic financial depth also help to reduce instability in growth of output, whilst political instability exacerbates output growth instability in the SSA emerging and frontier market economies. Increased trade promotes growth and diversification of domestic output, whilst increased domestic financial depth improves credit availability to finance domestic output for a stable expansion of domestic production. In addition, the study validates the assertion that there is a bi-directional relationship between international capital flows and the volatility of economic growth in capital-receiving developing countries. However, this hypothesis is only validated in the time series estimation results for South Africa, Zambia, Tanzania and Uganda. Lastly, emerging and frontier market economies in Sub-Saharan Africa have the ability to cope with domestic and external shocks that may impact on their domestic output.

Tentative recommendations can be made from the research findings for public policy in Sub-Saharan Africa. First, one of the means by which countries can achieve a more stable output growth is to encourage greater inflow of foreign capital. The policy measures for the attraction of greater inflows of international capital must be complemented with measures for increasing the

depth of domestic financial markets by means of increasing access to- and availability of credit, as well as improving financial infrastructure and intermediation. Sub-Saharan African countries must also pursue measures for greater diversification in domestic production and exports. This will reduce the susceptibility of these countries to shocks emanating from unexpected changes on the global commodities markets.

The basic limitation of the study is its inability to adequately capture the impact of development of segments of the domestic financial market on output growth stability covering the study period due to data limitations. Future research could look into the possibility of how international financial integration impacts on segments of the domestic financial market and its implications for economic growth and output diversification. Further investigations need to be conducted to unravel the effects of types of foreign debt inflows on the stability of growth in domestic output.

6.8 References

Agenor, P. R., McDermott, C. and Prasad, E. (2000): "Macroeconomic fluctuations in developing Countries", *World Bank Review* 14, 251-285.

Ahmed A. D. and Suardi, S. (2009): "Do financial and trade liberalization cause macroeconomic volatility in Sub-Saharan Africa?" *Working Paper No.44*, Centre for Strategic Economic Studies: Melbourne.

Baxter, M. and King, R. G. (1999): "Measuring business cycles: Approximate band-pass filters for economic time series", *Review of Economic and Statistics* 81(4), 575-593.

Bekaert, G, Harvey, C. and Lundbald, C. (2006): "Growth volatility and financial liberalization," *Journal of International Money and Finance* 25(3), 370-403. April.

Buch, C. M., Dopke, J. and Pierdzioch, C. (2002): "Financial openness and business cycle volatility", *Working Paper*: Kiel Institute of World Economics.

Buch, C.M., Döpke, J. and Pierdzioch, C. (2005): "Financial openness and business cycle volatility", *Journal of International Money and Finance 24*, 744-765

Calderon, C. and Schmidt-Hebbel, K. (2008): "Openness and Growth Volatility", *Central Bank of Chile Working Papers Number 483*, Central of Bank of Chile: Chile.

Canova, F., (1998): "De-trending as business cycle facts: A user's guide", *Journal of Monetary Economics* 41, 533-540.

Dasgupta, D. and Ratha, D. (2000): "What Factors Appear to Drive Private Capital Flows to Developing Countries? And How Does Official Lending Respond?" *World Bank Working Paper* 2392

Delechat, C., Ramirez, G., Wagh, S. and Wakeman-Linn, J. (2009): "Sub-Saharan Africa's integration in the global financial markets", *IMF Working paper* 09/114, May: International Monetary Fund.

Denizer, C. A., Iyigun, M. F. and Owen, A. (2002): "Finance and macroeconomic volatility", *The B.E. Journal of Macroeconomics 2(1), Article 7*.

Easterly, W., Islam, R. and Stiglitz, J. E. (2001): "Shaken and Stirred: Explaining Growth Volatility", B. Pleskovic and N. Stern (eds.), Annual World Bank Conference on Development Economics.

Eichengreen, B. (2002): "Capital account liberalisation: what do the cross-country studies tell us?" *The World Bank Economic Review 15 (3)*, 341-365.

Fatas A. and Mihov, I. (2003): "The case for restricting fiscal policy discretion", *The Quarterly Journal of Economics* 118(4), 1419-1447, November. MA: MIT Press.

Fatas, A. and Mihov, I. (2001): "Fiscal discipline, volatility and growth", Mimeo, The World Bank.

Fatas A. and Mihov, I. (2005): "Policy volatility, institutions and economic growth", *CEPR Discussion Paper Series*, December

Furceri, D. (2007): "Is Government Expenditure Volatility Harmful for Growth? A Cross-Country Analysis", *Fiscal Studies, Institute for Fiscal Studies 28(1)*, 103-120.

Gali, J. (1994): "Government Size and Macroeconomic Stability," *European Economic Review* 38, 117-132.

Gavin M. and Hausman, R. (1996): "Security stability and growth in a shock prone region: The policy challenges for Latin America", in R. Hausman and H. Reisen (eds.) *Security stability and Growth in Latin America: Policy issues and prospects for shock prone economies*, Cambridge: IDB/OECD press.

Hernandez, L., Mellado, P. and Valdes, R. (2001): "Determinants of Private Capital Flows in the 1970s and 1990s: Is there Evidence of Contagion?" *IMF Working Paper 01/64*. (Washington D. C.: International Monetary Fund).

International Monetary Fund: Regional Economic Outlook - Sub Saharan Africa in World Economic and Financial Surveys, April 2008.

Johnson, S., La Porta, R., Lopez-de-Silanes, F. and Shleifer, A. (2000): "Tunneling," *NBER Working Paper Series 7523*, Cambridge, MA: National Bureau of Economic Research

Kaminsky, G. and Schmukler, S. (2003): "Short-run pain, long-run gain: the effects of financial liberalization", *IMF Working Paper* No. 03/34, Washington, DC

Kose, M. A. (2002): "Explaining business cycles in small open economies: how much do world prices matter?" *Journal of International Economics 56, 299 – 327.*

Kose, A. M., Prasad, E., Rogoff, K. and Shang-Jin, W. (2006): "Financial globalization beyond the blame game", *Finance and Development 44(1), 9- 13.*

Kose, A. M., Prasad, E. and Terrones, M. E. (2003): "How does globalisation affect the synchronisation of business cycles?" *IMF Working Paper WP/03/27*, January: International Monetary Fund.

Lane, P. R. (2003): "Business cycles and macroeconomic policy in emerging market economies", Prepared for the Council on Foreign Relations / International Finance conference on

'Stabilizing the Economy: What Roles for Fiscal and Monetary Policy?' July 11 2002: Washington, D.C.

Lane, P. R. and Milesi-Ferretti, G. M. (2003): "International financial integration", *Institute for International Integration Studies Discussion Paper* No.03, July. Institute of International Integration Studies: Dublin.

Mendoza, E. (1994): "The terms of trade, the real exchange rate and economic fluctuations", *International Economic Review 36, 101-137*

Mougani, G. (2012): "An analysis of the impact of financial integration on economic activity and macroeconomic volatility in Africa within financial globalisation context", *Working Paper Series 144*. African Development Bank. February 2012.

Nelson, D. B. (1992): "Filtering and forecasting with misspecified ARCH models I: getting the right variance with the wrong model", *Journal of Econometrics, 52, 61-90*.

Offut, S. E. and Blandford R. (1986): "Commodity market instability: empirical techniques and analysis", *Resource Policy 12, 67-72*.

Persson, T. (2001): "Do political institutions shape economic policy", *NBER Working Paper* 8214.

Prasad, E., Rogoff, K., Shang-Jin, W. and Kose, M. A. (2003): "Effects of financial globalization on developing countries: some empirical evidence," IMF.

Razin, A. and Rose, A. K. (1994): "Business-cycle volatility and openness: an exploratory cross-sectional analysis", in L. Leiderman and A. Razin (eds.) *Capital Mobility: The Impact on Consumption, Investment, and Growth*, 48-76, (Cambridge: University Press).

Reinhart, C. and Rogoff, K. (2009): "This time it's different: eight centuries of financial folly", MPRA Paper 17452, September 2009 http://mpra.ub.uni-muenchen.de/17452/

Senay, O. (1998): "The effects of goods and financial market integration on macroeconomic volatility", *the Manchester School of Economics and Social Studies, 66, 39 – 61*.

Vo, X. V. (2005a): “International financial integration and economic growth - a Panel Analysis”, *Australian Finance Research Group Working Paper Series* 19(1), 155-170.

Vo, X. V. (2005b): “Determinants of international financial integration”, *Mimeo*, School of Economics – University of New South Wales.

Wolf, H. (2004): “Volatility: definitions and consequences”, in E. Prasad (eds.) *Managing volatility and crises: a practitioner’s guide*, 5-14, (Washington DC.: International Monetary Fund)

World Bank. World Development Indicators, various issues.

APPENDIX A6.1

Table A6.1.1: Order of integration of series, using the Augmented Dickey-Fuller and Philips-Perron tests

	Output growth volatility	Total foreign capital flows	Foreign equity flows	Total foreign debt flows	FDI inflows
Botswana	I(0)	I(0)	I(0)	I(0)	I(0)
Cape Verde	I(0)	I(0)	I(0)	I(0)	I(1)
Ghana	I(0)	I(0)	I(0)	I(0)	I(1)
Kenya	I(0)	I(0)	I(0)	I(0)	I(0)
Mauritius	I(0)	I(0)	I(0)	I(0)	I(0)
Mozambique	I(0)	I(1)	I(1)	I(0)	I(1)
Namibia	I(0)	I(0)			I(1)
Nigeria	I(0)	I(1)	I(0)	I(0)	I(0)
Seychelles	I(0)	I(0)	I(0)	I(0)	I(0)
South Africa	I(0)	I(1)	I(1)	I(0)	I(0)
Tanzania	I(0)	I(0)	I(0)	I(0)	I(1)
Uganda	I(0)	I(0)	I(1)	I(0)	I(1)
Zambia	I(0)	I(0)	I(0)	I(0)	I(0)
Senegal	I(0)	I(0)	I(0)	I(0)	I(0)
Angola	I(0)	I(0)	I(0)	I(0)	I(0)
Zimbabwe	I(0)	I(0)	I(0)	I(0)	I(0)

Note: I (0) and I (1) respectively denote integration of order zero and one; meaning that variables are respectively stationary in levels and first differencing

CHAPTER SEVEN

INTERNATIONAL CAPITAL FLOWS AND CONSUMPTION VOLATILITY IN SELECTED SUB-SAHARAN AFRICAN COUNTRIES

7.1 Introduction

The immediate objective of liberalizing cross-border capital movement in any given country is to stimulate greater flows of international capital and reap the benefits associated with the increased flows. One of the economic benefits associated with increased capital flows is that it helps consumers to smooth their consumption over time. By engaging in external borrowing and lending activities, consumers can mitigate shocks to their domestic income and, thus, stabilize growth of their consumption.

Theoretical literature, including the work of Buch and Yener (2005), Buch et al. (2002) and Bekaert et al. (2006), predicts that increased openness to international capital flows reduces consumption volatility. Empirical studies, including those of Ahmed et al. (2009), Herrera and Vincent (2008), and Buch and Yener (2005) and Bekaert et al. (2006), provide evidence of the predicted negative relationship between international capital flows and consumption volatility. However, studies that disentangle the effects of international capital flows on consumption volatility in Sub-Saharan Africa are yet to be identified.

The aim of this paper is to test the hypothesis that international capital flows reduce consumption growth volatility. The contribution of this paper to research is to disentangle the effects of international capital flows on consumption growth volatility in a sample of selected Sub-Saharan African countries[21]. Unlike the study by Ahmed and Suardi (2009) which used the standard deviation calculated over five-years (non-overlapping averages), we use the GARCH (1, 1)

[21]The selected countries are South Africa, Nigeria, Botswana, Ghana, Kenya, Mauritius, Mozambique, Namibia, Zambia, Uganda, Tanzania, Seychelles and Cape Verde. These countries have, to an extent, developed and deregulated their domestic financial markets, reduced restrictions on external capital flows and offered competitive investment environments to attract investments. One of the key objectives for these initiatives is the attraction of greater foreign capital flows (International Monetary Fund, 2008).

model to generate volatility measures that are time-dependent and reflect the time-dynamics of consumption growth instability.

This study is motivated by the fact that achieving high and stable growth rates in consumption expenditures contribute significantly to improved household welfare and poverty reduction (Laursen and Mahajan, 2005; Aizenman and Pinto, 2004).

The rest of the essay is organised as follows. The next section reviews the literature that explains the impact of international capital flows on consumption growth volatility. Section three reviews literature on other factors that have an influence on consumption growth volatility. The hypotheses and the estimated empirical model are presented in section four. Section five provides the sources and description of data used for the study. The estimation results for the relationship between financial integration and consumption growth volatility are presented and discussed in section six. Finally, section seven contains a summary of the findings of the research and concludes the discussion by indicating the basic limitation of the study and offering some directions for future extensions.

7.2 Capital flows and consumption volatility

Debreu (1959) and Arrow and Hahn (1971) postulate that risk-averse individual consumers and economies resort to international financial markets to mitigate the effects of shocks to production (or income) on the stability of their consumption. According to Auffret (2003), production or income shocks translate into fluctuations in consumption, if the means for managing risks are inefficient and not adequately- developed. Increased openness to international capital flows or access to international financial markets is one of the means of alleviating the adverse effects of temporary idiosyncratic shocks to income growth on consumption growth. Thus, theory strongly predicts a negative relationship between increased international capital flows (external borrowing and lending activities) and consumption growth volatility, based on the assumption that output or income shocks are temporary and country-specific. Razin and Rose (1994) postulate that if shocks to output or income are persistent and common across countries, increased capital flows will not influence consumption volatility.

Empirical studies, including those of Ahmed and Suardi (2009), Bekaert et al. (2006), and Buch and Yener (2005) do not offer conclusive evidence in support of the theoretically-predicted negative relationship between financial integration and consumption volatility. In a study of 25 selected African countries, Ahmed and Suardi (2009) identified a negative relationship between financial liberalization and consumption growth volatility. Bekaert et al. (2006) also examined consumption growth volatility for 95 developed and developing countries and identified equity market liberalization to reduce consumption growth volatility relative to that of output. Buch and Yener (2005) conducted a study of the G7 industrialised countries and identified that greater financial openness is correlated with lower consumption volatility, but did not identify any correlation between the volatility of consumption relative to output. Based on data from both the developed and developing economies, Kose et al. (2003) also used gross capital flows as a ratio of GDP and identified that greater financial integration is correlated with higher relative consumption volatility in most developing countries.

7.3 Determinants of consumption volatility

A number of country-specific characteristics and environmental factors have been identified in previous literature examining consumption growth volatility and these include domestic financial depth, fiscal policy, political institutions, and external trade openness. These are discussed in turn.

7.3.1 Domestic financial depth

Debreu (1959), Arrow and Hahn (1971), Auffret (2003) and Kose et al. (2003) show that individuals and, by extension, economies resort to well-developed domestic financial markets to mitigate the impact of production or income shocks on consumption. A well-developed domestic financial system increases options for risk-diversification, enhances opportunities for lending and borrowing activities, and consequently helps smooth consumption. In the absence of an efficient domestic financial and insurance market, shocks to production and income are translated into fluctuations in consumption growth. Consequently, theory predicts a strong negative relationship between financial integration and consumption growth volatility.

Empirical studies, including those of Kose et al. (2003) and Herrera and Vincent (2008), confirm the hypothesis that well-developed financial systems reduce consumption volatility. Based on cross-country data for the period 1960-2005, Herrera and Vincent (2008) used the ratio of total liquid liabilities to GDP and identified deeper and more stable domestic financial markets to reduce consumption volatility. Kose et al. (2003) also used the share of credit to the private sector in total GDP and identified domestic financial depth to be negatively correlated with consumption volatility.

7.3.2 Fiscal policy

The stabilizing influence of the government sector on consumption growth volatility has not been widely explored. Persson (2001) and Furceri (2007) show that the impact of government size and fiscal policy volatility on consumption growth patterns is ambiguous. A large government sector may point to large macroeconomic imbalances and countries that do not allow for a market-based allocation of capital for investments based on private market signals. In such a situation, it would be expected that volatility increases with size of the government sector. A large government sector may also be a reflection of the existence of a large welfare state with sophisticated policies to smooth out macroeconomic shocks. Thus, fiscal policy and size of government can be used to offset shocks and thereby reduce consumption volatility. The question of whether fiscal policy is used in this manner in practice, however, remains an empirical question (Kose et al., 2003). Although there is some evidence of a consumption-smoothing function for fiscal policy in mature economies, it is largely pro-cyclical in nature in some emerging markets, and hence, reflects a pro-cyclical access to borrowing (Wolf, 2004). Fiscal policy actions tend to have a pronounced effect on consumption in countries with less developed consumer credit markets and where larger proportions of the population have binding credit constraints (Tagkalakis, 2005).

Empirical studies, including that of Ahmed and Suardi (2009), identified fiscal policy changes as positively associated with income growth volatility. Kose et al. (2003) and Furceri (2007) also identified fiscal policy volatility as exacerbating macroeconomic instability. From a survey of existing literature, our working hypothesis is that fiscal policy tends to reduce instability in growth of consumption.

7.3.3 Political institutions

According to Bekaert et al. (2006), a stable government and favourable political environment contribute significantly to the establishment of high quality institutions that reduce risks and investment costs and consequently promote growth and stability. The extent of shocks faced by an economy and the establishment of an institutional framework to help smooth shocks are influenced by political factors. There is a possibility that governments only undertake effective reforms when such an institutional framework is put in place (Bekaert et al., 2006; Prasad et al., 2005). Empirical studies, including that of Bekaert et al. (2006), identified the quality of political institutions to be an important driver of consumption growth volatility, and showed that political institutions are more important than legal systems in explaining consumption growth volatility.

7.3.4 External trade openness

Another factor that influences the ability of countries to smooth out shocks to income and consumption is the extent of openness to the international commodities market. Krugman (1993) argues that the impact of international trade openness or integration on macroeconomic volatility is ambiguous and depends on the pattern of trade specialization and the nature of shocks. Increased trade openness leads to increased inter-industry specialization across countries, which in turn leads to industry-specific shocks, and consequently could contribute to output volatility. The increase in output volatility may translate into an increase in consumption volatility if the shocks are highly persistent (Kose et al., 2003). Increased trade integration or openness could also reduce volatility if the former is associated with increased intra-industry specialization, involving intermediate inputs trade, across countries. Thus, enhanced trade integration also leads to greater diversification across demand sources.

Empirical studies by Ahmed and Suardi (2009), Krugman (1993) and Razin and Rose (1994) provide mixed evidence of the relationship between trade integration and macroeconomic volatility. Ahmed and Suardi (2009) identified trade integration to be positively correlated with

output and consumption volatility, whilst Kose et al. (2003) identified trade integration to be negatively correlated with the volatility of consumption relative to that of output.

7.3.5 Inflation

The relationship between inflation and macroeconomic instability is widely established in the literature, including the work of Boyd et al. (2001) and the seminal work of Friedman (1977). Higher levels of inflation stimulate sporadic monetary policy responses, which in turn, result in greater uncertainty concerning the future rate of inflation. Uncertainty about future inflation distorts efficiency in resource allocation with its deleterious effect on output and consumption. Empirical studies, including that of Ahmed and Suardi (2009), identify that higher levels and volatility of inflation are positively correlated with output and consumption growth volatility.

7.4 Methodology

7.4.1 Hypothesis

The following is our basic working hypothesis drawn from a survey of theory and empirical literature: *increased international financial integration helps individual agents and, by extension, economies to reduce consumption growth volatility.*

7.4.2 Empirical Model

The empirical model for consumption growth volatility follows the works of Buch and Yener (2005), Bekaert et al. (2006), Kose et al. (2003), and Herrera and Vincent (2008). The ability of a country to smooth out shocks to its income and consumption depends on the extent to which the country is integrated with international financial and commodities' markets, the level of development of its financial sector and the quality of institutions. The estimated empirical model is presented below as follows:

$$\sigma_{it}^{c} = \alpha_i + b_1 fkiq_{it-1} + b_2 fkiq_{it-1}^2 + b_3 g_{it} + b_4 \sigma_{it}^{g} + b_5 \sigma_{it}^{y} + b_6 \pi_{it} + b_7 TO_{it-1} + b_8 pol_{it} + b_9 dc_{it-1} + e_{it} \quad (7.1)$$

where:

σ^{c}_{it}= volatility of growth in consumption, obtained from estimating the GARCH (1, 1) model;

$fkiq_{it-1}$= international financial integration, measured as the ratio of disaggregated foreign capital flows to GDP. That is the ratios of foreign debt flows and foreign non-debt flows to GDP;

$fkiq^{2}_{it-1}$ = the squared value for international financial integration, is used to capture the possible existence of threshold effect and therefore is an indication of a non-linear relationship;

g_{it} = size of government, measured as the ratio of government expenditure to GDP;

σ^{g}_{it} = fiscal policy volatility, obtained from estimating the GARCH (1, 1) model;

σ^{y}_{it} = gross domestic income volatility, obtained from estimating the GARCH (1, 1) model;

π_{it} = level of domestic inflation;

TO_{it-1} = trade openness indicator, measured as the ratio of sum of exports and imports to GDP (one period lagged);

pol_{it} = political institution, measured by the weighted conflict index obtained from the Data-Banks International; and

dc_{it} = depth of domestic financial market and availability of credit to the private sector, measured as the ratio of domestic credit to the private sector to GDP.

Similarly, the subscript i = 1, 2,…….N cross sections, and periods t = 1,2,…..T, with 'N' number of countries and T= 35 years, spanning the sample period 1975-2009. The notation α_{i} is the intercept.

Estimation of the dynamic panel model involved the use of the system-generalised method of moments (GMM) estimator.[22] This corrects for potential endogeneity biases that may arise from the inclusion of the lagged dependent variable and some explanatory variables in the equation. In addition, the system-GMM estimator enhances the precision and efficiency of the estimates (see Appendix A8 for detailed notes on justification).

7.5 Data and Variable Definition

Annual data covering thirteen emerging and frontier market economies in Sub-Saharan Africa were collected for the study, using a dynamic panel regression analysis. These economies have gone ahead to implement reform measures to liberalise their external capital account transactions and develop their domestic financial markets (see footnote 25).

With the exception of the weighted conflict index, data on all the variables were obtained from the World Bank's World Development Indicators 2010. Data on the weighted conflict index for the political environment were obtained from the Databanks International. The study period is from 1975 to 2009.

7.5.1 Consumption growth volatility

In most of empirical studies the standard deviation of annual output or consumption growth over a rolling window of three- to-five year rolling averages, was used. A large number of alternative measures have also been based on the standard deviation measure around a simple time trend. However, these measures have shortcomings. One of the limitations with use of this measure is that it entails loss of observations at the beginning of sample, as the computations provide an average value for the window's length. Another limitation is that volatility measures such as standard deviation and the coefficient of variation are deemed to overemphasize variability in non-trending series. The squaring of the values of these volatility measures also has a tendency

[22] The weakness with the application of this kind of estimation approach to a dynamic panel data model with a large time series and a comparatively small cross-section of countries is the possible existence of a high time series bias in the data construct. Data constraints did not permit a wider coverage, in terms of the cross-section of countries covered for the sample period chosen in the first estimation.

to worsen the problem of outliers (Canova, 1998; Offut and Blandford, 1986). Nelson (1992) showed that the simple ARCH and related models are identified as the most appropriate for assessing changes in volatility over time.

To account for the time dynamics of volatility, volatility is estimated in this study by using the following GARCH (1, 1) model:

$$C_t = C_{t-K}b + \varepsilon_t \quad (7.2)$$

$$\sigma_t^2 = \mu + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 \sigma_{t-1}^2 \quad (7.3)$$

where C_t is consumption growth and C_{t-K} is a k-period lag dependent variable. The notation σ_t^2 is the variance of the disturbance term from the mean equation (equation 1); μ is the mean; $\varepsilon_{t-1}^2$is the one-period lag of the squared residual from the mean equation which indicates news about volatility from the previous period; and σ_{t-1}^2 is the last period's forecast variance. The (1, 1) in the GARCH (1, 1) indicates the presence of a first-order GARCH term and a first-order ARCH term.

The model was estimated for individual countries. The advantage of individual country regressions is that it allows heterogeneity in the estimated coefficients. The sum of the coefficients, α_1+β_1, is a measure of volatility persistence. For a well-specified variance function, the sum of the coefficients must be less than 1. We also included a dummy for the period in which external financial liberalisation was carried out to capture changes in volatility during the period of liberalisation.

7.5.2 Foreign capital flows

International financial integration is measured by the ratio of disaggregated foreign capital flows to GDP. The disaggregation of the financial integration indicator into debt and non-debt indicators is meant to confirm the assertion that agents and economies engage in borrowing and lending activities in international financial markets, as a means to smooth their consumption and hence reduce consumption volatility (Bekaert et al., 2006). It is hypothesized in the literature,

including the work of Bekaert et al. (2006) and Herrera and Vincent (2008) that international financial integration helps individual agents and economies to reduce consumption volatility.

The squared value of foreign capital flows is also used in the estimation equation to find out whether the relationship between international capital inflows and instability in growth of consumption changes with increasing volumes of international capital inflows. Its inclusion in the equation is justified on the basis that literature, including studies done by Kose et al. (2003), Christiano (1987) and Easterly et al. (2001) suggest that increased openness to international capital flows reduces instability in growth of consumption expenditures only beyond a given threshold. At the initial stages of the integration process it could exacerbate consumption volatility because of the existence of weak institutions, poor quality and inappropriate policies and shallow domestic financial markets. However, beyond a given threshold, increased openness to international capital flows could lead to reduced consumption volatility because of the development of strong institutions, the implementation of relevant macroeconomic policies and the development of domestic financial markets during later the stages of the integration process.

7.5.3 Domestic financial depth

Kose et al. (2003) postulate that in the absence of adequately developed financial markets and insurance mechanisms, growth in consumption could be volatile in response to unanticipated changes in (or shocks to) income. Thus, under conditions of unanticipated (transitory) shocks to output and income, improved domestic financial depth and liquidity could help agents, and by extension economies to smooth consumption. The share of domestic credit to the private sector in total GDP is used as a measure of domestic financial development.

7.5.4 Fiscal policy

The size of government is measured by the ratio of total government expenditure to GDP. We construct a fiscal policy volatility indicator that is not influenced by the business cycle and indicates discretionary policy changes by estimating the following function using the GARCH (1. 1) model:

$$\Delta E_t = \alpha_i + \beta_i \Delta Y_t + \gamma_i \Delta E_{t-1} + \theta_i P_t + v_t \quad (7.4)$$

$$h_t^2 = w + c_1 \varepsilon_{t-1}^2 + d_1 h_{t-1}^2 \quad (7.5)$$

where:

-ΔE is the rate of growth in government spending

- ΔY is output growth in the current period

- $P$is vector of control variables including inflation.

- h_t^2 is the error variance;

- w is the mean;

- $\varepsilon_{t-1}$is the one-period lag of the squared residual from the mean equation which indicates news about volatility from the previous period; and

- h_{t-1}^2 is last period's forecast variance.

Following Fatas and Mihov (2003), we defined discretionary fiscal policy volatility as the residual series obtained from estimating the variance equation. The model was estimated for individual countries to allow for heterogeneity in the estimated coefficients. It is hypothesized in the literature, including the work of Kose et al. (2003) and Furceri (2007) that fiscal policy and size of government can be used to smooth consumption.

7.5.5 Income volatility

Our estimation of income volatility follows the work of Herrera and Vincent (2008). We define income growth in the current period as a function of the growth of income in the past two periods. Income growth volatility is measured as the residual series from estimating the variance equation in the GARCH (1, 1) model.

In the absence of adequate risk-management mechanisms, including well-functioning financial and insurance markets, shocks to income and consequently higher income volatility lead to higher volatility of household consumption (Christiano, 1987).

7.5.6 Inflation

This study used inflation as a proxy measure for quality of macroeconomic policy framework that determines the favourability of the macroeconomic environment. Very high levels (and often high volatility) of inflation in developing economies creates economic uncertainties and risks, increases costs and results in greater instability in the growth of output and consumption.

7.5.7 Openness to international commodities trade

Openness to external trade in commodities is measured by the share of imports and exports in total GDP. In the literature, including the work of Kose et al. (2003), the impact of external trade openness on macroeconomic volatility is ambiguous, and depends on the nature of shocks as well as patterns of trade specialization.

7.5.8 Political instability

Political institution is measured using the weighted conflict index for political climate obtained from the DataBanks International. It is hypothesized by Bekaert et al. (2006) and Prasad et al. (2005) that political institutions play an important role in influencing the extent of shocks faced in an economy.

7.6 Estimation Results

The first stage of the estimation exercise involved the use of the GARCH (1, 1) model to estimate volatility measures for total and household consumption growth as well as the volatility measure for growth in government expenditure. The GARCH (1, 1) was fitted for each of the 13 selected countries to determine the suitability of the model as a good descriptor of the volatility of consumption, government expenditure and gross domestic income. However, for the purpose of the focus of our analysis, we present the results from estimating the variance equations for only total and household consumption growth in Table 7.1.

In the case of total consumption growth, the estimated coefficients of the variance equation for 10 out of the selected 13 countries were found to be significant at least at the 10% level. In the

case of household consumption growth, the estimated coefficients of the variance equation for 8 out of the selected 13 countries were found to be significant at the 10% level. In the variance equation for total consumption growth, seven out of the 13 countries exhibited comparatively high coefficients estimates, whilst the parameter estimates for Kenya, Uganda and Zambia were low – they were statistically insignificant. Regarding the estimation results for the household consumption growth variance equation, five out of the 13 countries showed relatively high coefficients estimates, whilst five other countries exhibited very low and insignificant parameter estimates. In order to validate the hypothesis that consumption volatility reduces during periods of external financial openness in any country, we introduced a liberalization index for each country in the respective variance equations. Botswana, Cape Verde, Mauritius, Seychelles and Tanzania are the only countries where external financial liberalization had a significant impact on consumption volatility. In Cape Verde, an increase in the intensity of external financial liberalization increases household consumption growth volatility. An increase in the intensity of external financial liberalization also increased total consumption growth volatility in Botswana and Tanzania, whilst Mauritius and Seychelles experienced reduced consumption growth volatility during periods of increased intensity in the liberalization of their external financial sectors.

Table 7.1: Estimation of the GARCH (1, 1) model for consumption growth

		Constant	ARCH (1) (α_1)	GARCH (1) (β_1)	External financial liberalization index	Log-Likelihood
Botswana	Total consumption growth	2.080***	0.248***	0.883***	-5.680***	86.315
	Household consumption growth	9.087	0.542	0.378	-1.468	102.94
Cape Verde	Total consumption growth	2.479	0.212	1.238***	-0.689	82.39
	Household consumption growth	2.533***	0.219***	1.201***	-7.958***	95.69
Ghana	Total consumption growth	7.171	0.308	2.091	-2.910	84.29
	Household consumption growth	9.758	0.256	1.088***	-1.825	95.48
Kenya	Total consumption growth	-0.773	1.973**	0.009	1.206	83.20
	Household consumption growth	2.011	0.311**	1.013***	6.723	82.86
Mauritius	Total consumption growth	0.375	0.177***	1.038***	1.035***	80.04
	Household consumption growth	2.692	0.133***	1.029***	-1.275	61.36
Mozambique	Total consumption growth	5.991	0.407***	1.116***	-1.259	89.36
	Household consumption growth	4.581	0.852	0.226	-1.198	98.28
Namibia	Total consumption growth	7.203	0.190***	1.149***	-1.984	96.15
	Household consumption growth	-9.356	0.088	0.307	5.355	108.83
Nigeria	Total consumption growth	10.332	0.233***	0.567**	5.223**	96.02
	Household consumption growth	8.212	0.425	0.621**	2.112	85.11
Seychelles	Total consumption growth	1.085	-0.340	0.905*	2.629***	132.45
	Household consumption growth	1.593	-0.114**	1.046***	-4.438	134.49
South Africa	Total consumption growth	0.666	0.296	0.690***	-0.371	54.14
	Household consumption growth	1.701	-0.213	0.262	0.057	55.34
Tanzania	Total consumption growth	9.894**	-0.207	1.385***	-3.319**	549.81
	Household consumption growth	15.101	2.015*	-0.105	-4.980	520.57
Uganda	Total consumption growth	1.588	-0.042	0.148	6.067	95.12
	Household consumption growth	2.439**	0.892	1.101	-7.593	178.31
Zambia	Total consumption growth	5.163	-0.201	0.546	-6.129	109.51
	Household consumption growth	-1.092	0.491	0.378	1.665	112.92

Notes: *, **, *** *denote significance at 10%, 5% and 1% level of significance.*

Agenor et al. (2000) and Canova (1998) show that the size of the summed-up value of the ARCH and GARCH terms in the variance equation is a measure of persistence in volatility shocks. When the summed-up value of the coefficients of the ARCH and GARCH terms is equal to unity, the suggestion is that volatility shocks die out slowly, hence lower values of the summed-up terms indicate that volatility shocks die out much faster.

Table 7.2: Volatility Persistence in consumption growth

		Volatility Persistence, ($\tau = \alpha_1+\beta_1$)
Botswana	Total consumption growth	1.132
	Household consumption growth	0.920
Cape Verde	Total consumption growth	1.449
	Household consumption growth	1.420
Ghana	Total consumption growth	2.399
	Household consumption growth	1.344
Kenya	Total consumption growth	1.982
	Household consumption growth	1.324
Mauritius	Total consumption growth	1.215
	Household consumption growth	1.162
Mozambique	Total consumption growth	1.523
	Household consumption growth	1.078
Namibia	Total consumption growth	1.338
	Household consumption growth	0.394
Nigeria	Total consumption growth	0.800
	Household consumption growth	1.046
Seychelles	Total consumption growth	0.565
	Household consumption growth	0.932
South Africa	Total consumption growth	0.987
	Household consumption growth	0.049
Tanzania	Total consumption growth	1.178
	Household consumption growth	1.911
Uganda	Total consumption growth	0.106
	Household consumption growth	1.993
Zambia	Total consumption growth	0.345
	Household consumption growth	0.869

In 11 out of the 13 selected countries, the persistence measures were at least close to unity, indicating the presence of an integrated GARCH phenomenon and underlining continual changes in the volatility of total and household consumption growth. Whilst total consumption volatility persistence was highest in Ghana, Kenya, Namibia and Mozambique, the level of total

consumption volatility persistence is least in Uganda, Zambia and Seychelles. The level of household consumption volatility persistence is also highest in Uganda and Tanzania, but least in South Africa and Namibia.

7.6.1 Total consumption volatility

The second stage of the regression involved the estimation of the impact of external capital flows on consumption volatility. Findings from the estimation results are presented in Table 7.3. The diagnostic tests for the dynamic specification indicate that the model is well specified. The new residuals for the specification are, at times, auto-correlated of order 1, but not auto-correlated of order 2. The Sargan test results also confirm the validity of the over-identifying restrictions and use of the instruments.

The estimation results indicate that foreign debt and non-debt capital flows have a significant impact on total consumption volatility in emerging and frontier market economies in Sub-Saharan Africa. Other major determinants of total consumption volatility identified in the study are inflation, size of government, fiscal policy volatility, income volatility, domestic financial depth in the previous period and the crisis period of 2007. The key determinants of household consumption volatility identified in the study are inflation, openness to external trade in the previous period, size of government and fiscal policy volatility. The first order lag dependent variable is also statistically significant in both the total and household consumption volatility specifications.

The coefficient of the one-period lagged foreign debt inflow is positively signed and statistically significant at 1 per cent in the specification for total consumption volatility. The result suggests that foreign debt inflow in the previous period increases total consumption volatility in the selected countries. However, the coefficient of the squared value of one-period lagged foreign debt inflow is negatively signed and statistically-significant in the specification for total consumption growth volatility. The finding confirms the validity of the threshold hypothesis in explaining the relationship between financial integration and consumption volatility, and compares favourably with the results obtained by Kose et al. (2003).

Contrary to a priori expectations, the relationship between non-debt capital flows and consumption volatility is found to be positive for both the one-period lagged and squared values, suggesting that increased non-debt inflows amplify consumption volatility in the selected countries. The estimation results also identified consumption volatility to be negatively correlated with rising inflation and increasing size of government, but positively correlated with fiscal policy volatility, income volatility and a one-period lagged domestic financial depth indicator. The findings suggest a stabilizing role for government fiscal policy and the underdevelopment of domestic financial markets in Africa. Factors that were not identified to be important determinants of total consumption volatility are openness to international commodities markets and political instability.

7.6.2 Household consumption volatility

The estimation results for household consumption growth volatility show that inflation, openness to international commodities markets, size of government and fiscal policy instability are the main determinants of household consumption volatility in the selected countries. Rising inflation and increasing size of government contribute positively to stability in the growth of household consumption. However, increased openness to international commodities trade and increased fiscal instability destabilizes growth in household consumption. The positive and statistically-significant correlation between the first-order lagged dependent variable and the value of the dependent variable in the current period could serve as an indicator of the persistence of household consumption growth volatility in the selected countries. The finding also reflects the limited coping abilities of the selected countries to deal with shocks that adversely affect growth in household consumption.

The results failed to identify rising international capital flows as an important determinant of household consumption growth volatility in the selected countries. Other factors that were not identified to be important determinants of household consumption volatility are political instability and domestic financial depth.

Table 7.3: System dynamic panel regression for consumption growth

Variables	Total cons. volatility	Total cons. volatility	Total cons. volatility	Household cons. volatility	Household cons. volatility
First order lag dep. Variable	0.604 (1.42)	0.694 (1.48)	-0.061*** (-2.93)	1.098*** (4.50)	1.095*** (5.35)
Foreign debt flows (% GDP, one period lag)	1.270* (1.63)			-0.053 (-0.02)	
Foreign debt flows(%GDP, one period lag) squared value divided by 100	-0.794** (-2.29)			-0.512 (-1.42)	
Foreign non-debt capital flows (%GDP, one period lag)		0.289* (1.70)			0.358 (1.08)
Foreign non-debt capital flows (%GDP, one period lag) squared value divided by 100		0.082* (1.69)			1.470 (1.06)
Inflation rate	0.066 (0.57)	0.082 (0.61)	-0.031** (-2.09)	-0.327*** (-5.32)	-0.287*** (-3.95)
External commodities trade (%GDP, one period lag) – logarithmic value	1.237 (1.21)	-0.457 (-0.72)	-7.453 (-1.29)	5.545** (2.37)	4.204*** (2.73)
Political climate (weighted conflict index)	-0.113 (-0.73)	-0.149 (-0.86)	-0.340 (-0.91)	0.053 (1.05)	0.661 (1.11)
Size of government (government expenditure as % of GDP)	-0.756** (-2.02)	-0.459 (-1.09)	0.188 (1.50)	-1.374* (-1.60)	-1.786** (-1.99)
Fiscal policy volatility (government expenditure growth volatility)	0.232* (1.85)	0.065 (0.86)	-0.010 (-0.35)	0.616*** (2.64)	0.762*** (2.72)
Gross domestic income volatility	-0.111 (-0.25)	-0.534 (-1.42)	0.111*** (4.57)	1.175 (0.66)	1.475 (0.94)
Private sector credit ratio (one period lag)	3.836* (1.68)	0.233 (0.92)		-1.099 (-1.27)	-0.991 (-1.20)
Sargan test	1.000	1.000	1.000	1.000	1.000
Serial correlation test (1^{st} order)	0.299	0.200	0.060	0.269	0.276
Serial correlation test (2^{nd} order)	0.553	0.882	0.345	0.329	0.325

*Note: All regressions included time dummies, not reported here. *, **, *** denote significance at 10%, 5% and 1% l. o. s. The t-statistics are in parentheses.*

The economic rationale for the significant coefficients is provided as follows. Firstly, the statistically significant and positively signed coefficient for foreign debt capital inflows and a negatively signed coefficient for its squared value suggest that there is a threshold effect of international debt inflows on consumption growth instability in the selected countries. Below a certain threshold level of international debt, inflow of the debt capital exacerbates instability in growth of total consumption. However, beyond that threshold level of international debt, further inflow of international debt capital leads to a decline in consumption growth instability. One possible explanation for this is that increased openness to international capital flows compels countries to develop their domestic financial sectors, implement an appropriate macroeconomic policy framework and develop strong institutions for an efficient management of the debt inflows over time. Secondly, the destabilising effect of non-debt capital flows on total consumption growth volatility could be explained by the fact that non-debt capital flows are used to directly augment investments in the production sector and do not directly benefit the household sector. Thirdly, the negative correlation between inflation rate and consumption growth instability could be explained by the fact that the emerging and frontier market economies have successfully kept the rate of inflation at levels conducive to the promotion economic growth. It could reflect the fact that incomes have grown at rates that exceed the rate of inflation. Fourthly, the statistically significant and positively signed coefficient for external trade openness in the specifications for household consumption volatility could be explained by the fact that increased openness to international commodities trade has exposed the selected countries to trade-related industry-specific shocks, which in turn has destabilised domestic output and income. Increased instability in output and income has in turn destabilised growth of household consumption due to the persistence of the trade-related shocks. Fifthly, the negative sign of the coefficient value for the fiscal policy variable and the positive sign of the coefficient value for its volatility could suggest that governments spend to stabilise income and consumption. It reflects the important contribution made by fiscal policy in cushioning consumers against shocks that affect their income and consumption. The significant and positive coefficient for income volatility is an indication of the high reliance of economic agents on domestic income for consumption expenditures. Lastly, the statistically significant and positively signed coefficient for private sector credit ratio in the specification for total consumption could

be explained by the fact that the domestic financial markets in most of the selected countries remain shallow.

7.7 Conclusions and Recommendations

In this study, the focus was on the impact of international capital flows on consumption growth volatility in emerging and frontier market economies in Sub-Saharan Africa. The first stage of the study involved the use of the GARCH model to generate volatility measures for consumption growth. The second stage of the study involved an estimation of the impact of foreign capital flows on consumption growth volatility.

Overall, the study finds evidence in emerging and frontier market economies in Sub-Saharan Africa to support the proposition that increased international financial integration helps countries to reduce consumption growth volatility. This applies to international debt capital inflows and occurs only beyond a given threshold level of integration. The findings are similar to the outcome from studies by Kose et al. (2003), Cristiano (1987) and Easterly et al. (2001). The impact of foreign debt capital inflows applies mainly to government consumption volatility. Foreign non-debt capital inflow is most likely used to augment investments in domestic production. The study also gives an indication of the fact that SSA emerging and frontier market economies have succeeded in reducing the rate of inflation to moderate levels, leading to a rise in real incomes and subsequent reduction in consumption growth instability. The findings from the study also indicate that increased openness to international commodities trade destabilizes growth in household consumption. In addition, fiscal policy is identified to be counter-cyclical and an effective tool for consumption smoothing, and as such suggests a significant contribution of national governments to social welfare enhancements in countries without well-developed consumer credit markets. Fiscal stability is also identified as critical for the achievement of a stable growth in consumption. The study also confirms the assertion that developing countries lack adequate risk-management mechanisms to help cushion them against shocks to their income that adversely impact on consumption growth. Additionally, findings from the study reflect the continual underdeveloped nature of financial markets and their inability to adequately finance

consumption in Sub-Saharan Africa. Lastly, the study provides evidence to support the assertion that developing countries have limited coping abilities to mitigate the adverse effects of shocks to income and consumption.

Some useful lessons can be drawn from the study and tentative suggestions can be to help reduce consumption growth volatility in the countries studied. First, countries aiming to reduce instability in the growth of consumption expenditures can resort to overseas borrowing. Governments in Sub-Saharan Africa must resort to effective strategies that help with developments of their domestic financial markets. The development of domestic financial markets will ensure an efficient intermediation of overseas credit, which in turn, will ensure that the household sector benefits from international loans inflows. One of the reasons why the government sector appears to be the only sector benefiting from overseas loans is the underdeveloped nature of domestic financial markets in Sub-Saharan Africa. Another recommendation that can be made from the findings of the study is that policies must be directed at identifying and dealing with factors responsible for the detrimental effect of increased external trade openness on household consumption. The latter recommendation is made because there is a large body of empirical studies, including the work of Wolf (2004) and Prasad et al. (2005), which shows an important contribution made by external commodities trade openness to the reduction of household consumption growth instability. The role of fiscal policy in achieving a stable growth in both government and household consumption expenditures must also be maintained in countries where domestic financial markets are yet to be developed. Lastly, efforts must be made to put in place risk-management mechanisms that enhance the coping abilities of African countries and insure them against shocks that adversely affect growth in their consumption expenditures.

The basic limitation of the study is its inability to adequately capture the impact of development of components of the domestic financial market on consumption growth stability covering the study period due to data limitations. Future researchers could look into the possibility of determining identifying factors responsible for the negative impact of external commodities trade on household consumption growth instability. Future studies must also examine the role of overseas borrowing in shaping fiscal policy in sub-Saharan Africa. Lastly, it is recommended

that future related studies be focused on individual country case studies. Pursuing country-case studies will unearth existing differences in the magnitude of consumption growth instability as well as differences in the nature of the impact of external financial openness across the selected countries.

7.8 References

Ahmed, A. D. and Suardi, S. (2009): "Do financial and trade liberalization cause macroeconomic volatility in Sub-Saharan Africa?" *Working Paper No.44,* Centre for Strategic Economic Studies: Melbourne.

Agenor, P. R., McDermott, C. and Prasad, E. (2000): "Macroeconomic fluctuations in developing countries", *World Bank Review* 14, 251-285.

Aizenman, J. and Pinto, B. (2004): "Introduction", *Handbook of Volatility*, Washington: World Bank.

Arrow, K., and Hahn, F. (1971): *General Competitive Analysis,* San Francisco: Holden-Day.

Auffret, P. (2003): "High consumption volatility: the impact of natural disasters?" *World Bank Policy Research Working Paper* 2962, World Bank: Washington DC.

Bekaert, G, Harvey, C. and Lundbald, C. (2006): "Growth volatility and financial liberalization," *Journal of International Money and Finance*: 25(3), 370-403. April.

Boyd, J. H., Levine, R. and Smith, B.D. (2001): "The Impact of inflation on financial sector performance", *Journal of Monetary Economics*, 47, 221-248.

Buch, C. M., Dopke, J. and Pierdzioch, C. (2002): "Financial openness and business cycle volatility", *Kiel Working Paper* 1121, Kiel Institute of World Economics: Germany.

Buch, C. M. and Yener, S. (2005): "Consumption volatility and financial openness", *Kiel Working Paper Number 1260*. Kiel Institute of World Economics: Germany.

Canova, F. (1998): "De-trending and business cycle facts: a user's guide", *Journal of Monetary Economics* 41, 533-540

Christiano, L.H, (1987): "Why is consumption less volatile than income?", *mimeo*. Federal Reserve Bank of Minneapolis

Debreu, G. (1959): *Theory of Value.* New York: Wiley.

Easterly, W., Islam, R. and Stiglitz, J. E. (2001): "Shaken and stirred: explaining growth volatility", By B. Pleskovic and N. Stern (eds.), Annual World Bank Conference on Development Economics, (Washington: the World Bank).

Fatas A. and Mihov, I. (2003): "The case for restricting fiscal policy discretion", *The Quarterly Journal of Economics* 118(4), 1419-1447, November. MA: MIT Press.

Friedman, M. (1977): "Nobel lecture: inflation and unemployment", *Journal of Political Economy* 85, 451-472.

Furceri, D. (2007): "Is government expenditure volatility harmful for growth?: a cross-country analysis," *Fiscal Studies* 28, 103-120.

Herrera, S. and Vincent, B. (2008): "Public expenditure and consumption volatility," *Policy Research Working Paper* 4633, The World Bank.

Kose, A., Prasad, E. and Terrones, M. (2003): "Financial integration and macroeconomic volatility," *IMF Staff papers* 50(special issue), 119-142.

Krugman, P. (1993): "Lessons of Massachusetts for EMU", in F. Giavazzi and F. Torres (eds.) *The Transition to Economic and Monetary Union in Europe*, 241-261 (Cambridge: Cambridge University Press).

Laursen, T. and Mahajan, M. (2005): "Volatility, income distribution and poverty", in J. Aizenman and B. Pinto (eds.) *Managing Economic Volatility and Crisis: a Practitioner's Guide*, 101-136 (Cambridge: Cambridge University Press).

Nelson, D.B. (1992): “Filtering and forecasting with misspecified ARCH models I: getting the right variance with the wrong model,” *Journal of Econometrics*, 52, 61-90.

Offut, S. E. and Blandford, K. (1986): “Commodity market instability: empirical techniques and analysis” *Resource Policy* 12, 67-72.

Persson, T. (2001): “Do political institutions shape economic policy?” *NBER Working Papers, 8214* (Massachusetts: National Bureau of Economic Research).

Prasad, E., Kose, M. A., Rogoff, K. and Shang-Jin, W. (2005): "Financial globalization: beyond the blame game", *Finance and Development* 44(1), 9-13.

Razin, A. and Rose, A. K. (1994): “Business-cycle volatility and openness: an exploratory cross-sectional analysis”, in L. Leiderman and A. Razin (eds.), *Capital Mobility: The Impact on Consumption, Investment, and Growth*, 48-76 (Cambridge: University Press).

Tagkalakis, A. (2005): “The asymmetric effects of fiscal policy on private consumption over the business cycle”, *mimeo*. London: Bank of England.

Wolf, H. (2004): “Accounting for consumption volatility differences”, *IMF Staff papers 51* (Special issue).

World Bank: *World Development Indicators*, (various issues)

CHAPTER EIGHT

CONCLUSIONS AND RECOMMENDATIONS

8.1Introduction

As part of the push for economic reforms in the 1990s, a large number of SSA countries began liberalising their economies, including the liberalisation of their external financial sectors. The implementation of the reform measures has encouraged greater inflows of international capital, but has also exposed countries to the risk of possible capital flow reversals, and financial crisis. In many instances, the exposure to financial and currency risks is very disruptive of national economies as it impacts negatively on the stability of growth in investments, domestic output and consumption. Several studies have sought to establish the major causes of recent trends in international capital flows and to reveal the impact of international capital flows on the stability of investment, output and consumption growth. However, the documented literature does not offer any clear evidence on the leading determinants of international capital flows as well as the relationship between international capital flows and the instability of growth in investments, output and consumption. The lack of any clear evidence necessitates case by case studies to unravel the actual determinants of international capital flows and their impact on the stability of growth in investment, output and consumption.

Although studies on international capital flows in Sub-Saharan Africa have examined the causes of changes in the volume of capital flows (see Delechat et al., 2009; Ahmed et al., 2005; and Asiedu 2002), the case is not necessarily so for the maturity of the flows, an area that seems to have implications for the achievement of financial and economic stability in the sub-region (see Ishii and Habermeier, 2002; Rana, 1998). In addition, although studies that examine the impact of international capital flows on the stability of economic growth have been found for Sub-Saharan Africa (see Ahmed et al., 2009; Mougani, 2012), they do not necessarily examine the impact of types of capital flows on the time dynamics of stability in investments, output and consumption growth in the sub region. This thesis sought to fill the research gaps. The significance of the thesis can therefore be found in its quest to examine the impact of financial liberalisation, regionalism and political institutions on the volume, type and maturity mix of international capital flows in selected Sub-Saharan African countries. It includes an analysis of

the distinction between short- and long-term impacts of external financial liberalisation on international equity flows in selected countries. These subjects were covered in the first three stand-alone research papers. The intention of the thesis was also to investigate the impact of types of capital flows on the stability of growth in investments, output and consumption in selected Sub-Saharan African countries. These subjects were covered in the last three stand-alone research papers.

A dynamic panel and time series regression analyses of data covering the emerging and frontier market economies in SSA were used as tools to achieve the objective of identifying key determinants of the volume, type and maturity of international capital flows. The overall objective of assessing the impact of international capital flows on the stability of investments, and of growth in domestic output and consumption in the selected SSA countries was also achieved by the use of the GARCH model, dynamic panel and time series regression analyses. Interesting findings from an investigation of all the issues raised in the study are summarised in the next sub-section.

8.2 Summary of findings

8.2.1 Determinants of foreign capital flows

Findings from the study confirm the hypothesis that the liberalisation of external capital accounts transactions is an important prerequisite for attracting international capital flows in SSA emerging and developing economies. The findings are consistent with results obtained by Delechat et al. (2009) and Ahmed et al. (2005). In particular, FDI liberalisation, equity market liberalisation and reductions in multiple exchange rate practices were found to be the main types of capital accounts liberalisation that influence international capital flows in SSA emerging and frontier market economies. Our results validate the proposition that domestic financial liberalisation is an important determinant of cross-border capital movement in SSA emerging and frontier market economies. This applies, particularly, to the attraction of foreign direct investments. Additionally, the results validate the assumption that the liberalisation of different aspects of international capital flows affects overall international investment inflows in different ways. Further, there is some evidence to support the hypothesis that regionalism contributes

significantly and positively to the attraction of international capital flows in developing countries. However, this applies only to the attraction of FDIs.

Other determinants of international capital flows are increased domestic financial depth, increased openness to external commodities trade, institutionalised democracy, natural resources endowment, higher economic growth rates and developments in international interest rates. The study also confirms the hypothesis that emerging and frontier market economies play a dominant role in attracting international capital flows to SSA.

8.2.2 Explaining international equity flows

Findings confirm the hypothesis that external financial liberalisation has a long-run effect on international equity flows. Liberalising the capital account transactions is an important pre-requisite for the attraction of greater inflows of foreign equity in South Africa and Nigeria. The results are similar to the study by Boamah et al. (2007) for Jamaica and Trinidad and Tobago. The study also confirms the hypothesis that external financial liberalisation has a short-run impact on foreign equity flows in Nigeria. Increased depth of domestic financial markets impacts positively on international equity flows in South Africa in the long- and short-run, whilst improved growth performance impacts positively on international equity flows in Nigeria in only the long term. Furthermore, global conditions- play an important role in determining the volume of inflows of international equity to South Africa and Nigeria. An increase in international interest rates discourages foreign investments in South Africa and Nigeria in the short-run. The results are similar to those by Wesso (2001). There is also evidence that international equity flows to South Africa and Nigeria have declined significantly during the 2008-2009 global financial crisis.

The results from the impulse response functions indicate that international equity flows respond negatively to unanticipated shocks from the domestic financial markets, and positively to their own shocks and to unanticipated policy shocks in South Africa. In Nigeria, international equity flow responds positively to its own shocks and unanticipated shocks to domestic output growth. However, financial policy shocks impact negatively on output growth in the Nigerian economy. The results are consistent with the findings of Wesso (2001). Lastly, effective instruments for

international equity flows in South Africa and Nigeria respectively are domestic credit expansion (in the case of South Africa) and policies for stimulating higher economic growth (in the case of Nigeria). The results are consistent with the findings of Wesso (2001) which indicate domestic output growth as an important source of variations in capital flows in South Africa. However, in view of the fact that domestic credit expansion has come at a tremendous cost in terms of interest rates and volatility of the South African currency, the extension of domestic credit must be complemented with other measures to stimulate substantial growth in direct production and increased diversification of domestic output.

8.2.3 Foreign debt inflows

Our findings confirm the hypothesis that countries with more open and democratic institutions borrow less of short-term capital from overseas than those with autocratic institutions. This applies to the analysis for the entire sample of 37 SSA countries. In the selected sample of 16 emerging and frontier market economies, both types of institutions, namely democracy and autocracy, have led to the attraction of greater inflows of short-term debt capital. Secondly, the study finds evidence to support the proposition that countries with more open and democratic systems of governance tend to attract more long-term loan inflows. This applies to the entire sample of 37 SSA countries, the selected sample of 16 emerging and frontier market economies and the selected sample of 12 HIPC beneficiary countries. Thirdly, non-HIPC countries (irrespective of the type of political institution established) borrow comparatively more of short-term capital whilst HIPC beneficiary countries with more open and democratic institutions borrow more of long-term capital. Fourthly, findings from the study confirm the assertion that the maturity mix of foreign debt capital changes in favour of long-term debt capital in countries with more open and democratic institutions. Additionally, our findings indicate that global developments play an important role in determining the flows of foreign debt to the selected SSA countries. The proposition that foreign debt inflows decline during periods of global financial crisis, is validated in the study findings for short-term debt flows to the 16 emerging and frontier market economies, but rejected in the study findings for the entire sample of 37 SSA countries. Foreign debt flows to the entire sample of 37 SSA countries increased during the 2007-2009 global financial crisis period, which in turn suggests a possible influence of investors from

leading merging economies, including China and India. The nature of influence of economic growth in advanced countries on international debt flows to selected SSA countries depends on the occurrence of a global financial crisis and an economic recession. Furthermore, the research findings suggest that countries that benefit from international debt relief initiatives receive less of the volume of debt inflows but an increase in the proportion of short term debt in foreign debt inflows. Also, an increase in domestic financial depth contributes to the attraction of greater foreign debt capital in the entire sample of 37 SSA countries. Our findings also confirms the reduction of regulatory restrictions on overseas borrowing as an essential pre-requisite for successful attraction of greater foreign debt capital to the selected SSA countries. Lastly, there are differences in how institutional development, increased domestic financial depth and reduction in regulatory restrictions on overseas borrowing affect the volume of foreign debt flows to the HIPC beneficiary and non-HIPC countries.

8.2.4 International capital flows and investment volatility

Overall, the study fails to accept the hypothesis that foreign capital exacerbates investment volatility. Instead, foreign direct investment, foreign debt and portfolio investment inflows reduce investment volatility in emerging and frontier market economies in Sub-Saharan Africa. Other key determinants identified in the study are the development and stability of the domestic financial sector, political climate and inflation volatility.

8.2.5 Foreign capital flows and output growth volatility

Overall, the study finds evidence to support the proposition that increased international capital inflows help emerging and developing economies to reduce instability in growth of their domestic output. This applies to foreign equity inflows. The findings compare favourably with the results obtained by Ahmed and Suardi (2009) which indicates that financial liberalisation reduces output and consumption growth volatility in 25 selected African countries. Our findings however indicate that aggregate foreign capital inflow exacerbates output growth instability, but reduces it when democratic institutions are established in the selected countries. The establishment of democratic institutions enhances the ability of foreign capital inflows to reduce instability in growth of output in the SSA emerging and frontier market economies. Furthermore,

increased openness to international commodities trade and increased domestic financial depth also help to reduce instability in growth of output, whilst political instability exacerbates output growth instability in the SSA emerging and frontier market economies. Increased trade openness promotes growth and diversification of domestic output, whilst increased domestic financial depth improves credit availability to finance domestic output for a stable expansion of domestic production. In addition, the study validates the assertion that there is a bi-directional relationship between international capital flows and the volatility of economic growth in capital-receiving developing countries. However, this hypothesis is only validated in the time series estimation results for South Africa, Zambia, Tanzania and Uganda. Lastly, emerging and frontier market economies in Sub-Saharan Africa have the ability to cope with domestic and external shocks that may impact on their domestic output.

8.2.6 International capital flows and consumption growth volatility

Overall, the study finds evidence that emerging and frontier market economies in Sub-Saharan Africa support the proposition that increased international financial integration helps countries to reduce consumption growth volatility. This applies to international debt capital inflows and occurs only beyond a given threshold level of integration. The findings are similar to studies by Kose et al. (2003), Christiano (1987) and Easterly et al. (2001). Foreign debt capital inflows reduce government consumption volatility, but foreign non-debt capital inflows are more likely used to augment investments in domestic production and have no direct impact on consumption. The study also gives an indication of the fact that SSA emerging and frontier market economies have succeeded in reducing the rate of inflation to moderate levels, leading to a rise in real incomes and subsequent reduction in consumption growth instability. The findings of the study also indicate that increased openness to international commodities trade destabilizes growth in household consumption. In addition, fiscal policy is identified to be counter-cyclical and an effective tool for consumption smoothing, and as such suggests a significant contribution of national governments to social welfare enhancements in countries without well-developed consumer credit markets. Fiscal stability is also identified as critical for the achievement of a stable growth in consumption. The study also confirms the assertion that developing countries lack adequate risk-management mechanisms to help cushion them against shocks to their income

that adversely impact on consumption growth. Additionally, findings from the study reflect the underdeveloped nature of financial markets and their inability to adequately finance consumption in Sub-Saharan Africa (SSA). Lastly, the study provides evidence to support the assertion that developing countries have limited coping abilities to mitigate the adverse effects of shocks to income and consumption. The findings of the study have implications for public policy, which are discussed below.

8.3 Implications for further studies

Issues arise from the findings of the study which offer some directions for future research. Firstly, future extensions to the study could be focused on unravelling the time effects of the liberalisation. Secondly, future research could be directed at disaggregating the regionalism index to capture the separate impacts of regional trade integration and regional financial liberalisation, with focus on a larger sample of countries in the sub-region. Thirdly, the study could be extended to cover the direct impact of the development and active membership of regional blocs on the regional financial integration, with emphasis on the volume of regional cross-border capital flows. In addition, further extensions of the research could be directed at investigating the long- and short-run impacts of institutions, regulatory and macroeconomic reforms, and infrastructure on international capital flows to Sub-Saharan African countries. Future studies could also be conducted to determine the contribution of other types of institutions and regulatory measures to the attraction of foreign finance with different terms of maturity in developing economies. Other issues that arise and could be addressed in future extensions of the study include: the impact of foreign capital flows on the development of the different segments of the domestic financial markets and its implications for economic growth stability; unravelling the effects of types of foreign debt capital inflows on economic stability; and the role of overseas borrowing in shaping fiscal policy in Sub-Saharan Africa. Additionally, future related studies could focus on individual country case studies. Pursuing country-case studies would unearth existing differences in the magnitude of consumption growth instability as well as differences in the nature of the impact of external financial openness across the selected countries. Lastly, future studies could consider an analysis of the sources of international capital inflows and their impact on countries in SSA. There is an increasing body of studies that point to the leading

emerging economies (including China, and to a lesser extent India), as key investors in Africa. In some African countries (including Sudan, Angola and Chad), China is the main source of international capital inflows. It is very likely that the key determinants, and economic impact, of capital flows from emerging economies could be different from those coming from Africa's traditional partners.

8.4 Limitations of study

One major limiting factor in this study was inadequate data, both in terms of the time period and number of countries covered. This constrained efforts to sufficiently capture the impact of portfolio investments and development of segments of the domestic financial markets on international capital flows and economic growth instability. In addition, studies of this nature are usually saddled with overwhelming difficulties, including the limited usefulness of partial equilibrium (single equation) models. Consequently, recommendations made in the thesis ought to be regarded as offering some form of tentative suggestion. The inability to obtain sufficient data made it impossible for the study to cover a long time period for a larger number of countries in Sub-Saharan Africa. A large part of the data on foreign portfolio investment inflows recorded for SSA countries is only recent and does not allow for a long time series analysis of causes and effects.

References

Ahmed A. D. and Suardi, S., (2009): "Do financial and trade liberalization cause macroeconomic volatility in Sub Saharan Africa?" *Working Paper No.44*, Centre for Strategic Economic Studies: Melbourne.

Ahmed, F., Arezki, R. and Funke, N. (2005): "The composition of capital flows: Is South Africa different?" IMF Working Paper 05/40 (Washington: International Monetary Fund)

Arellano, M. and Bond, S. (1991): "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations." *Review of Economic Studies* 58, 277-297.

Arellano, M. and Bover, O. (1995): "Another look at the instrumental variable estimation of the error-components models", *Journal of Econometrics* 68(1), 29-51.

Blundell, R., and Bond, S. (1998): "Initial conditions and moment restrictions in dynamic panel data models", *Journal of Econometrics* 87, 115-143.

Boamah, D., Craigwell, R., Downes, D., Greenridge, K. and Mitchell, T. (2007): "The impact of capital account liberalisation in the Caribbean", in R. Craigwell, K. Greenridge and M. Williams (eds.), *Aspects of financial liberalisation and capital market development in the Caribbean*, 133-153. Barbados: Central Bank of Barbados.

Christiano, L.H, (1987): "Why is consumption less volatile than income?", *mimeo*. Federal Reserve Bank of Minneapolis

Delechat, C., Ramirez, G., Wagh, S., and Wakeman-Linn, J. (2009): "Sub-Saharan Africa's integration in the global financial markets", *IMF Working paper* 09/114, International Monetary Fund: Washington D.C.

Denizer, C. A., Iyigun, M. F. and Owen, A. (2002): "Finance and macroeconomic volatility", *The B.E. Journal of Macroeconomics* 2(1), Article 7.

Easterly, W., Islam, R. and Stiglitz, E. (2001): "Shaken and stirred: explaining growth volatility", In B. Pleskovic and N. Stern (Eds.), Annual World Bank Conference on Development Economics.

Hirata, H., Kim, S. H. and Kose, M. A. (2004): "Integration and fluctuations: The case of MENA", *Emerging Markets Finance and Trade* 40 (6), 48-67.

International Monetary Fund (1999): "The cross-border initiative in Eastern and Southern Africa", African and Policy Development and Review Department, the IMF

International Monetary Fund, Regional Economic Outlook: Sub Saharan Africa *in World Economic and Financial Surveys*, April 2009.

Kose, A. M., Prasad, E. and Terrones, M. E. (2003): "How does globalisation affect the

synchronisation of business cycles?" *IMF Working Paper WP/03/27*, January: International Monetary Fund.

Ostry, J. D., Atish R., Ghosh, K. H., Chamon, M., Qureshi, M. S. and Reinhardt, D. B. S. (2010): "Capital Inflows: The Role of Controls", *IMF Staff Position Note* 2010/04

Prasad, E., Kose, A. M., Rogoff, K. and Shang-Jin, W. (2005): "Financial Globalization beyond the Blame Game", *Finance and Development* Volume 44(1), 9-13.

Vo, X. V. (2005b): *Determinants of International Financial Integration*, School of Economics – University of New South Wales

Wesso, G. R. (2001): "The dynamics of capital flows in South Africa: an empirical investigation", *Quarterly Bulletin* 220 (June 2001), 59-78. South African Reserve Bank

Wolf, H. (2004): "Volatility: definitions and consequences", in E. Prasad (eds.) *Managing volatility and crises: a practitioner's guide*, 5-14, (Washington DC.: International Monetary Fund)

World Bank, World Development Indicators, various issues

Appendix A8

The system-GMM estimator

Estimation of the dynamic panel model involved use of the system generalised method of moments estimator. This corrects for potential endogeneity biases that may arise from the inclusion of the lagged dependent variable and some explanatory variables in the equation. The application of the ordinary least squares (OLS) estimator, the generalized least squares (GLS) estimator and the least squares dummy variables (LSDV) estimator leads to biased and inconsistent estimates when a lagged dependent variable is included in the estimation. To account for this shortfall, the Arellano-Bond linear estimator is normally used to estimate the dynamic panel data model. The procedure involves the use of lagged levels of the dependent

variable as instruments for the lagged differenced dependent variable. It also involves use of the lags of some explanatory variables as instruments for those variables, to account of the potential endogeneity of such variables. Arellano and Bond (1991) confirm that using the lagged difference as an instrument results in a much more superior estimator. This estimation procedure proposed by Arellano and Bond (1991) is known as the first difference Generalized Method of Moments (GMM) estimator or the Generalized Method of Moments-Instrumental Variables (GMM-IV) estimator. It has the advantage of producing unbiased and consistent estimates. The number of potential instruments is huge. There is a wide range of possible instrumental variables for endogenous, predetermined and strictly exogenous explanatory variables. These can be used for single instrumental variable estimations.

However, in situations where the disturbance term is heteroscedastic across countries and over time, Arellano and Bond suggest the use of the two-step estimator. The two-step GMM estimator is regarded as more efficient in such a situation. A major setback of the Arellano and Bond estimator however, is its failure to take advantage of all available moment conditions under standard assumptions. This could produce consistent but inefficient estimates. As such, Arellano and Bover (1995) concurrently estimate the model in both levels and first-differences as a way of improving on the first differenced GMM estimator. The Arellano-Bover estimator uses the first differenced variables as instruments in the level regression and employs the lagged values of the variables in levels as instruments in the first-differenced regression. Blundell and Bond (1998) show that the system-GMM estimator is more accurate and efficient than the first-differenced GMM estimator. As a result, we employ the system-GMM estimator in our estimation of the dynamic panel data model. Lastly, an attempt is made to evaluate the soundness of the model specification by using the test for over-identifying constraints and the test of second order autocorrelation of the new residuals. The estimation exercises employed the Intercooled Stata 9.0 software package.